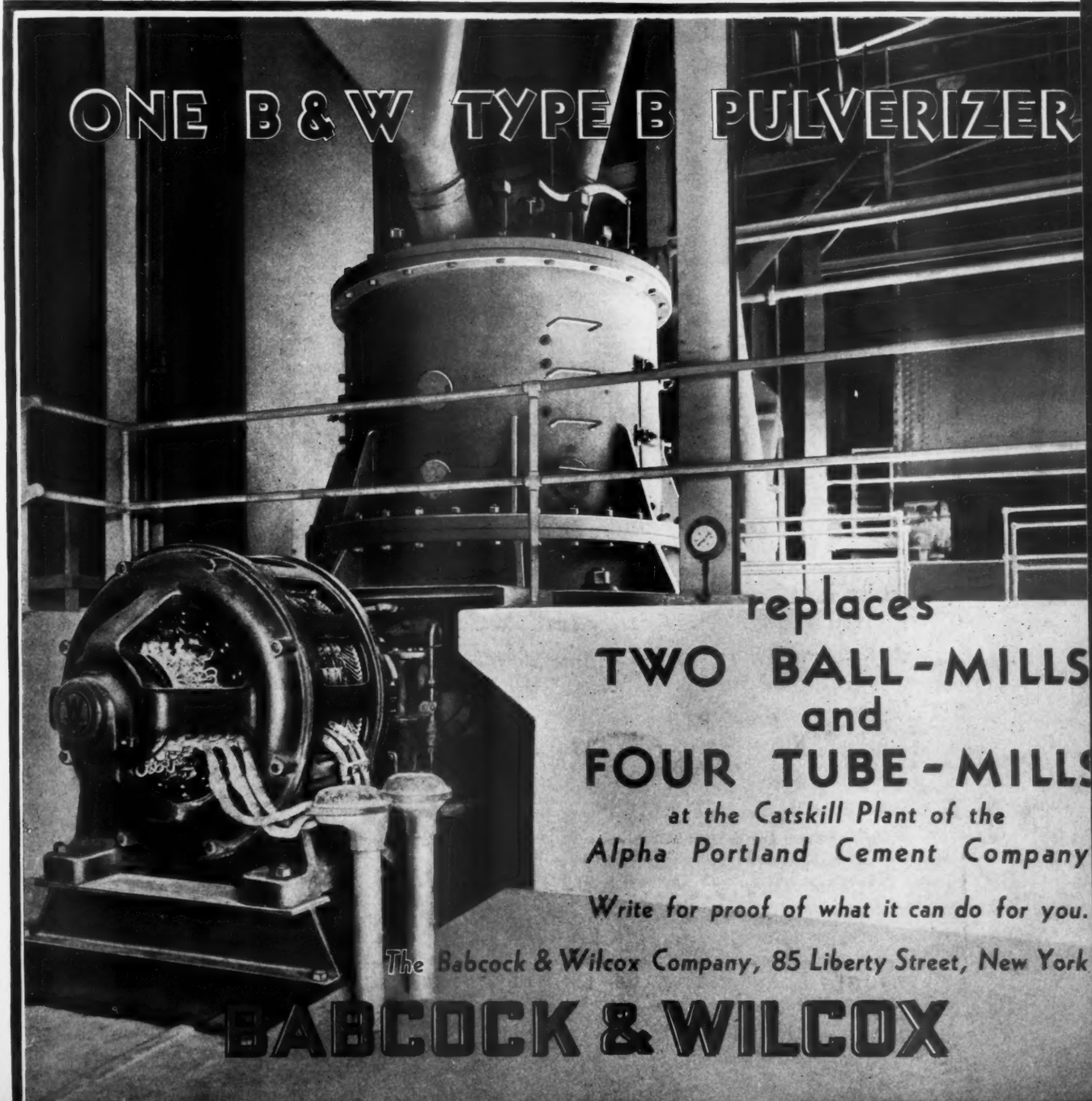
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APR

Rock Products

and CEMENT and ENGINEERING NEWS (Est. 1896)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY



TRU·LAY *Preformed*



OUTLASTS THE BUCKET TEETH

● On this job Tru-Lay Preformed Wire Rope gave 520 hours of service—in work so hard it ruined the bucket teeth faster than it wore out the rope.

The job is removing 35 feet of overlay from an Indiana coal mine. This overburden is so hard the bucket has to fight its way through by constantly being jerked. A more severe test of wire rope would be hard to find.

One non-preformed rope lasted only one day; the best non-preformed rope "took it" for only 10 days. Tru-Lay Preformed went on 12/18/34—came off 2/1/35. 520 working hours of service! At the time this ad is written the second Tru-Lay Preformed Rope is still in service.

Needless to say, Tru-Lay Preformed is very popular at this operation. Tru-Lay Preformed would be very popular at *your* operation, too. Send for complete information.

AMERICAN CABLE COMPANY, Inc.

Wilkes-Barre, Pennsylvania

In Business for Your Safety

District Offices: Atlanta, Chicago, Denver, Detroit, New York, Philadelphia, Pittsburgh, Houston, San Francisco

ACCO

TRU·LAY * *Preformed* Wire Rope

* PREFORMED ROPE IS MADE IN ALL TYPES, GRADES, CONSTRUCTIONS AND LAYS

AN UNUSUAL PICTURE OF AN UNUSUAL PLANT

Designed and Built by LINK-BELT
for McGrath Sand & Gravel Co., Chillicothe, Ill.





A MODERN concrete and steel plant with the best of washing, screening and sizing equipment for gravel, as well as classifying equipment for sand, to meet the most rigid aggregate material specifications. Includes modern stock pile system with overhead distributing conveyor and tunnel with conveyor system for recovering and loading into cars.

Since 1912 Link-Belt has designed, built and equipped 10 complete plants for McGrath, of which this is the most recent.

LINK-BELT
EQUIPMENT FOR PREPARING SAND—GRAVEL—STONE

LINK-BELT COMPANY 5260

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power
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With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

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The A. B. P. is a nonprofit organization whose members have pledged themselves to a working code of a practice in which the interests of the men of American industry, trade and professions are placed first—a code demanding unbiased editorial pages, classified and verified paid subscribers, and honest advertising of dependable products. The A. B. C. is an organization which audits and verifies publishers' circulation claims and records.

The Greeks had a use for it—but they didn't have MONARCH WHYTE STRAND



"60% Longer Service"

A Missouri contractor reports that the first length of Monarch Whyte Strand (¾" 6 x 19) he used on his shovel gave him 40 days' service. The rope he had previously been using gave a maximum of only 25 days' service. Result—he ordered 4 more lengths of Monarch Whyte Strand for immediate delivery.

"Unloaded 360 Barges"

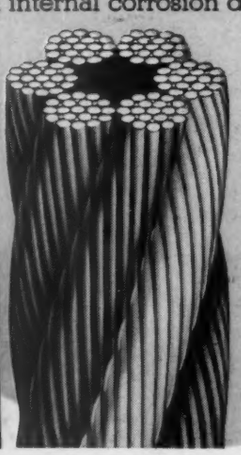
Monarch Whyte Strand (⅞" 6 x 19) was recently installed on a clamshell bucket unloading sand and gravel barges on the Potomac River. The rope was finally retired after it had unloaded 360 barges! This exceeds by a substantial margin all previous records made by all other Preformed ropes.

MACWHYTE COMPANY, KENOSHA, WIS.

Manufacturers of a complete line of wire ropes for shovels, drag line excavators, slack line excavators, quarry derricks, digging and bucket hoist lines, clamshell cranes.

Get the facts about this Triple-Feature Wire Rope for today's toughest jobs...

● Monarch Whyte Strand is made for tough assignments—made for jobs where maximum strength and dependability are essential. **1.** High stamina is guaranteed by careful heat treating and drawing of each individual wire. **2.** A special kind of permanent internal lubrication protects each wire in the strand from internal corrosion and internal friction. **3.** *Preformed* construction withstands bending with minimum strain. See Monarch Whyte Strand performance records at left. And write for free sample, catalog and complete data.



AD NO. 190

MONARCH WHYTE STRAND—PREFORMED and Internally Lubricated Wire Rope

"FOUR LARGE BLASTS" . . . .

were responsible for this Letter!

DUBUQUE STONE PRODUCTS COMPANY

PRODUCERS
CRUSHED STONE
AGRICULTURAL LIME
WHOLESALERS AND RETAILERS
BUILDING MATERIALS
SAND AND GRAVEL
COAL AND COKE

DUBUQUE, IOWA Dec. 13, 1934.

Mr. R. D. Rawson,
The Atlas Powder Co.
940 35th St.,
Des Moines, Iowa

Gentlemen:

In operating one of the largest quarries in Iowa over a number of years, we have used a considerable quantity of practically all types and makes of explosives obtainable in this area.

Since blasting constitutes one of the major operating costs and the result obtained lends its influence quite materially to other operating costs, we naturally were desirous of selecting and using the explosive best suited for blasting in this area.

Recently, and for the last four large blasts, we have used your new Apex Dynamite. It is our opinion that in Apex we have found the two essentials for economical blasting, i.e. the power to obtain maximum displacement, plus the speed to obtain good fragmentation.

In the first blast with Apex, we used the same quantity of dynamite as used with other makes, and the result disclosed that we could reduce this by at least 15 percent. This we have been doing since with favorable results. The fragmentation obtained with Apex has been so much better that we have effected a further saving of 20 percent on our secondary drilling and blasting costs.

As we continue the process of manufacturing, we find another and most important saving. This is the 16 percent increase in the loading capacity of the shovels due to uniform fragmentation.

In concluding, congratulations Atlas Powder Company for having produced a very good dynamite, one which we feel will contribute to the progress of the industry.

Sincerely,

DUBUQUE STONE PRODUCTS COMPANY,
by Herbert E. Manahl
Herbert E. Manahl,
Superintendent



The distinctive flexible water-proof Apex cartridge

They tried practically all types and makes of Explosives

They tried APEX and found the ideal combination of Power for Maximum displacement and Speed for good Fragmentation

APEX saved 15% on Explosives and 20% on Secondary drilling and Blasting

Ask the Atlas Representative to tell YOU about APEX

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

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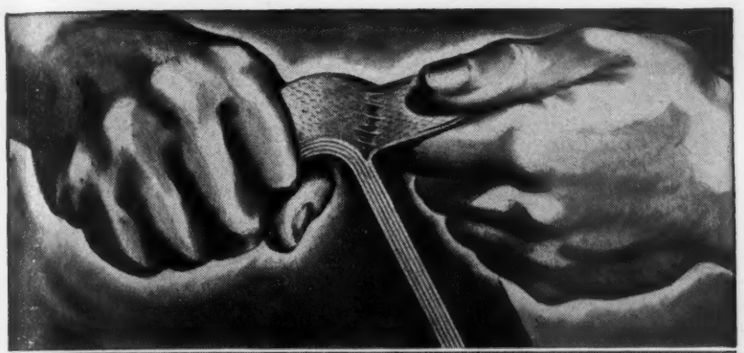
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ATLAS

EXPLOSIVES

ATLAS EXPLOSIVES

When muscles bought belts





ONLY ONE FEATURE WAS PROVED . . .

A strong bond between plies is only one factor in over-all conveyor belt quality.

ONLY a few years ago buyers thought they could determine belt quality by pulling down a belt's various plies. But we who make conveyor belts know that such a procedure merely indicates the strength of the friction rubber.

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"U.S." has been signally successful in achieving this end. "U.S." Matchless, Giant, Amazon and Security conveyor belts are famous throughout all Industry for satisfactory performance accomplished. Extremely long life, freedom from trouble and low ultimate cost have won them the high regard of engineers everywhere.

The long experience of "U.S." in advising on the selection of the proper belt as to *quality-ply and cover thickness* is available to you without obligation.

United States Rubber Company
1790 Broadway **New York, N. Y.**

Stocks in all Industrial Centres

U.S. CONVEYOR ELEVATOR BELTING — *An Outstanding Value of the United States Rubber Company*



Forged steel— Heat treated

GRINDING BALLS

THE grinding requirement of maximum outputs to a determined fineness of finished product depends on the quality of the grinding media used.

Quality in LORAIN GRINDING BALLS is the sum of new steel rolled to definite specifications, plus controlled heat treatments, plus the application of determined chemical and physical properties of steel to a knowledge of your grinding requirements.

A purchase of LORAIN BALLS consists of no other obligation on the part of the buyer than assurance of satisfactory results in your grinding, at lowest possible costs.

We also design and manufacture to your requirements, ball and tube mill linings in Manganese Steel, Chrome Nickel Steel, Chrome Nickel Molybdenum Steel or in White Iron Castings.

Balls for cement, ore or other grinding, can be furnished very promptly in the following diameters—

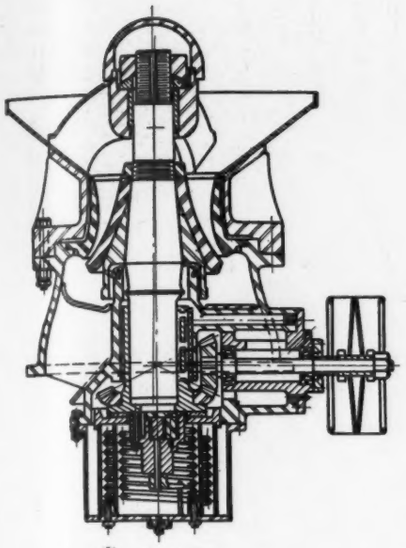
½" - ⅝" - ¾" - ⅞" - 1" - 1¼" - 1½" - 2" - 2½" - 3" - 3½" - 4" - 4½" - 5".

THE LORAIN STEEL COMPANY

General Office: 545 Central Avenue, Johnstown, Pennsylvania

Sales Offices: Atlanta, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh and Denver
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Export Distributor: United States Steel Products Company, 30 Church St., New York City, N. Y.

United States Steel Corporation Subsidiary



We repeat— for small sizes, in good quantity, your best buy is the

TRAYLOR TYPE TY REDUCTION CRUSHER

This crusher stands only a little over four feet high and weighs only about 9,000 lbs. It can be set to as small as ¼", delivers up to 30 tons per hour and uses not over 25 H.P.

The TY is fitted with Traylor Original, Patented, Non-Chokable Bell Head and Curved Concaves, is built with an all cast steel frame, and has all of the exclusive features of Traylor Bulldog and Type TZ Crushers.

Its low price will amaze you—write for details and ask for our special descriptive circular No. 1001.

We would also like to talk to you about fitting your old gyratory with Non-Chokable Bell Head and Curved Concaves. Hundreds of old machines have been so rejuvenated. Write for particulars or have our man around for a talk!



CRUSHER ON TESTING FLOOR—ALL TY CRUSHERS ARE FULLY ASSEMBLED AND TESTED BEFORE SHIPMENT

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ALLENTOWN, PENNSYLVANIA, U.S.A.

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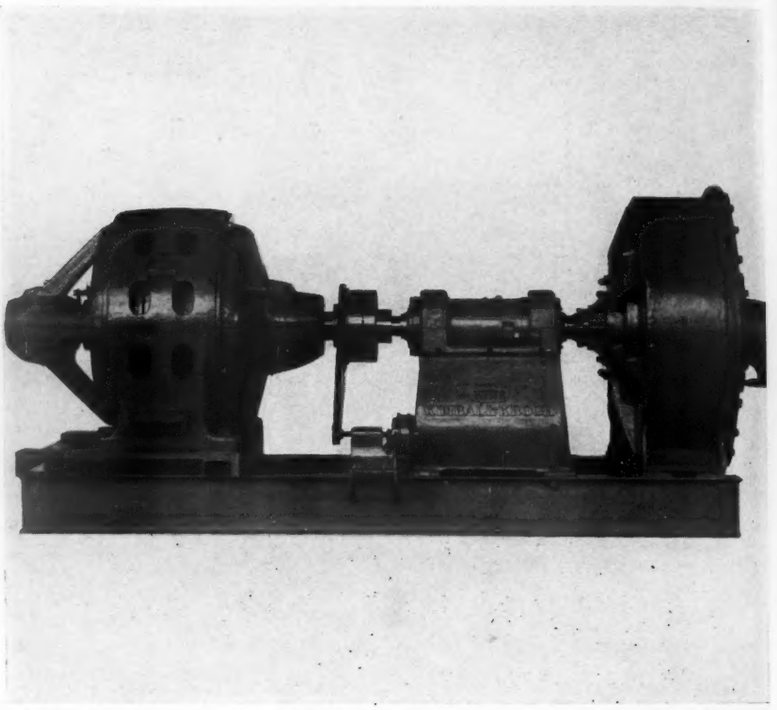
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IF IT'S A HARD JOB

It's Easy for SKF

● SKF makes practically *all types of anti-friction bearings.* When SKF recommends a particular type of bearing, therefore, you may depend upon it; its recommendations are *unbiased!*





SKF-EQUIPPED BUILT BY KIMBALL-KROGH PUMP CO.



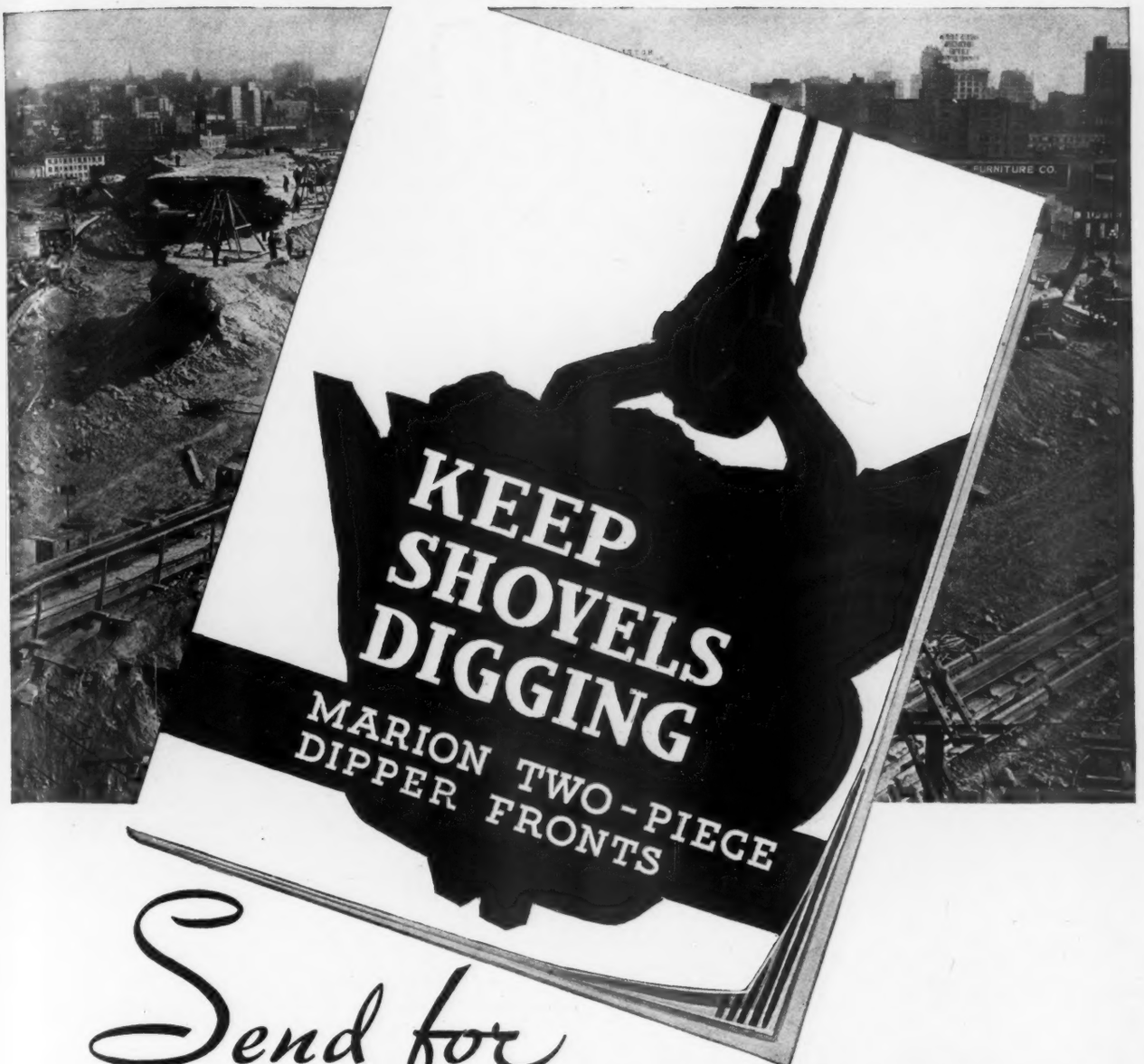
The good performance of this seven-foot high Kimball-Krogh pump writes a strong testimonial for SKF on thrust and radial ends of the shaft. It proves that the bigger the jobs in the rock products field, the greater the need for bearings that can stand the gaff . . . and KEEP standing it . . . without troubles, shutdowns, or constant attention.

It proves that from the very outset SKF has manufactured *up* to a definite standard of quality . . . and stayed there. It proves that SKF Bearings never need adjustments . . . and run for long intervals on only one lubrication. If you want a bearing that keeps pumps at their highest efficiency longest . . . that will eliminate troubles caused by bearing wear . . . that will insure low operating costs . . . TRY SKF!

SKF

BALL AND ROLLER BEARINGS 3376

SKF INDUSTRIES, INC., Front St. & Erie Ave., Philadelphia, Pa.



Send for

THIS FOLDER OF DIPPER FACTS

Every Marion owner is keenly interested in keeping dipper replacement and maintenance costs to a minimum. Marion Two-Piece Dipper Fronts (Black Patent) have a splendid reputation for accomplishing this very thing. To write for a free copy of this timely and enlightening folder on the subject is to be prepared to save money on future dipper replacements.

THE MARION STEAM SHOVEL CO. *Marion·Ohio*

SHOVELS • CLAMSHELLS • DRAGLINES • CRANES • GAS • DIESEL • ELECTRIC • GAS ELECTRIC • DIESEL ELECTRIC • STEAM

AN EXCAVATOR FOR EVERY MATERIAL HANDLING NEED

NITR

T R A D E

SOME FACTS ABOUT THIS



This is the first announcement in trade publications of NITRAMON—a new product developed during the past four years in the du Pont research laboratories.

This new patented blasting agent when manufactured and sold by the du Pont Company is identified by the trade mark NITRAMON. It differs radically in properties from any blasting material previously used in well-drilling operations.

Probably one of the most important of the many advantages of NITRAMON is its safety in handling. It is not an explosive in the accepted sense of the word. When subjected to the usual tests applied to explosives, it cannot be detonated by:

—a commercial blasting cap

—or Cordeau—or flame—or by impact

The full blasting strength of NITRAMON is developed, however, when a detonating primer of sufficient energy is used.



RAMON

M A R K

S NEW BLASTING MATERIAL

The insensitiveness of **NITRAMON** to ordinary handling makes it possible to pack it in tightly sealed metallic containers—the water resistance of which is unlimited, provided cans are properly handled and loaded.

NITRAMON is non-headache—not only because of its package, but also because it contains no nitroglycerin.

It is absolutely non-freezing.

NITRAMON is made in five grades, **A** to **E**, inclusive, all having the same high strength per unit of weight. These grades differ only in density, that is, in bulk strength or strength per foot of bore hole. They are packaged in cans ranging upward in size from 4 inches diameter by 16 inches in length.

NITRAMON is recommended only for *quarrying, open-pit mining, stripping* and other operations where well drills are used and large holes are the practice.

The photos shown below were taken at a typical quarry where fourteen holes, 6 inches in diameter and averaging 105 feet deep, contained the necessary NITRAMON.

Not only were potential hazards to life and property reduced, but results, excellent in point of execution, were secured at a *substantial saving in cost* as compared with explosives previously used.

A bulletin containing information relative to methods of use, grades available and other practical information will be sent on request. Please address nearest office.

E. I. DU PONT DE NEMOURS & CO., Inc.

Explosives Department **Wilmington, Delaware**

BRANCH OFFICES:

Birmingham, Ala.; Boston, Mass.; Chicago, Ill.; Denver, Colo.; Duluth, Minn. Huntington, W. Va.; Joplin, Mo.; Juneau, Alaska; Kansas City, Mo.; New York N. Y.; Pittsburgh, Pa.; Portland, Ore.; Pottsville, Pa.; St. Louis, Mo.; San Francisco, Calif.; Scranton, Pa.; Seattle, Wash.; Spokane, Wash.; Springfield, Ill.; Wilkes-Barre, Pa.

DU PONT

REG. U.S. PAT. OFF.



CLAY DRYING WITH THE KILN MILL



Hammer-type Kiln Mill, a simple, practical, efficient unit for drying and pulverizing.

THE Raymond system of reducing the product and removing the moisture at the same time, with a single machine, is successfully applied in clay drying operations.

A recent installation consists of a hammer-type Kiln Mill with a coal-burning furnace unit for supplying hot gases to the system. It is designed to dry and pulverize a special type of fire clay.

The mill is equipped with a table feeder which sweeps the clay from the feed bin into the drying tower above the pulverizer. The clay as fed to the mill contains about 15% moisture. The Kiln Mill reduces the moisture content below 1% and grinds the material to a fineness of 85% to 90% passing 200-mesh, delivering approximately 4 tons per hour.

Both operations are done at once, shortening the time of process, eliminating separate dryers, and simplifying the handling of the material. The resultant savings greatly lower the cost of production, while the initial investment is much less than for the usual equipment.

Raymond Bros. Impact Pulverizer Co.

Division of Combustion Engineering Co., Inc.

1307 North Branch Street, CHICAGO

Sales Offices in New York and Los Angeles

Canadian Representative:

Combustion Engineering Corporation, Ltd., Montreal

Other applications of the Kiln Mill described in this 8-page Bulletin. Copy sent on request.



Remarkable economies shown in drying and grinding limestone, gypsum, bauxite and similar materials.

RAYMOND

PULVERIZING • SEPARATING • FLASH DRYING • DUST COLLECTING



Worn-out pump shell rebuilt and work hardened for approximately half the cost of new ones, yet it gives 25% to 50% longer wear.

CONSIDER THESE *FACTS*

The McLean Process of rebuilding old, worn-out parts will give you two to four times longer service than new parts. The rebuilt portion, built-up from nickel-manganese steel, is thoroughly work hardened to a maximum before the hard surfacing is applied. Then the toughened base metal is hard surfaced with wear-resisting alloy steel, producing a super-tough tool-steel working edge or surface. This means an immediate STOP to replacement expense and a decided increase in profits.



Chilled iron crusher head rebuilt with nickel-manganese steel, giving equal service of new manganese head, at far less cost.

Dipper teeth rebuilt for $50 which was less than the cost of the original ones, yet they have outworn them 100 per cent.



The Moulding-Brownell Corporation of Thornton, Ill., has claimed double yardage for these teeth.

NICKEL-MANGANESE
Saving Thousands of Dollars

Don't junk those worn out parts. Salvage them by the McLean Process. Rebuilding can be done right in your own plant without expense of shipping. On light, easily transported parts—these can be sent direct to our factory. We will do a good rebuilding job at reasonable cost and ship job back in jig time.

We will apply hard facing and wear-resisting alloys to all types of pump shells, dipper teeth, crusher heads, crusher jaws, pulverizer hammers, gears, etc. The cost is far below that of new parts and the job outlasts several new parts. Think of the saving—the elimination of shut-downs, etc. Don't go on spending hard-earned profits on new parts when your old one can be made to give better, longer service at far less cost.

Here is the proof: Send us a set of worn-out manganese dipper teeth, and we will rebuild, work-harden and hard-surface them and pay the freight BOTH WAYS for less than the cost of a new set—just to prove that such rebuilt teeth will outwear new ones two to three times. This is a real opportunity to save money and keep equipment on the job much longer.

Let Us Quote You Prices

McLean Welded Products Corporation

532 West 79th Street, Chicago, Illinois



Style "B" Newhouse Crusher

FOR GREATER PRODUCTION

and uniform product

NEWHOUSE Crushers, with their short rapid crushing action, meet the industry's requirements for large capacities, high reduction, and uniform product. The large unobstructed receiving openings permit easy feeding. The drive is direct by an electric motor mounted above the crusher spider. There are few working parts, all readily accessible, and no gears or belts.

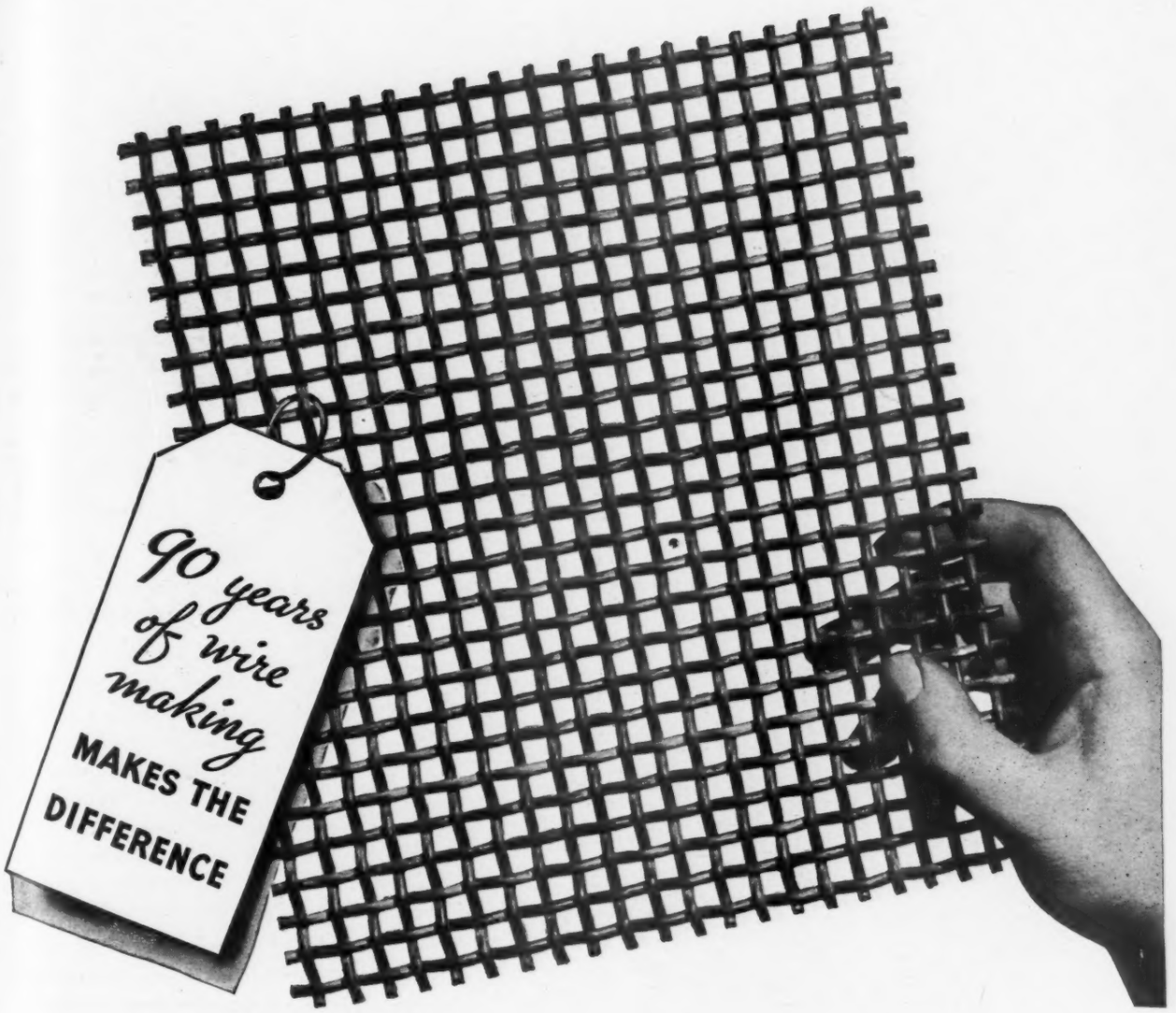
Reversible, non-choking concaves are furnished as standard equipment except for small feed and fine product. A new type of dust seal positively prevents leakage of oil and prevents dust or water from entering the eccentric bearing.

This crusher unlike all others does not require an expensive permanent foundation. It is suspended from the plant structure by means of three cables that not only support the crusher, but also absorb the vibration and shock of crushing and prevent it from being transmitted to the supporting structure.

We would like to show you operating records of these modern crushers and how they have saved money in many crushing and mining plants. Get in touch with the nearest Allis-Chalmers office.

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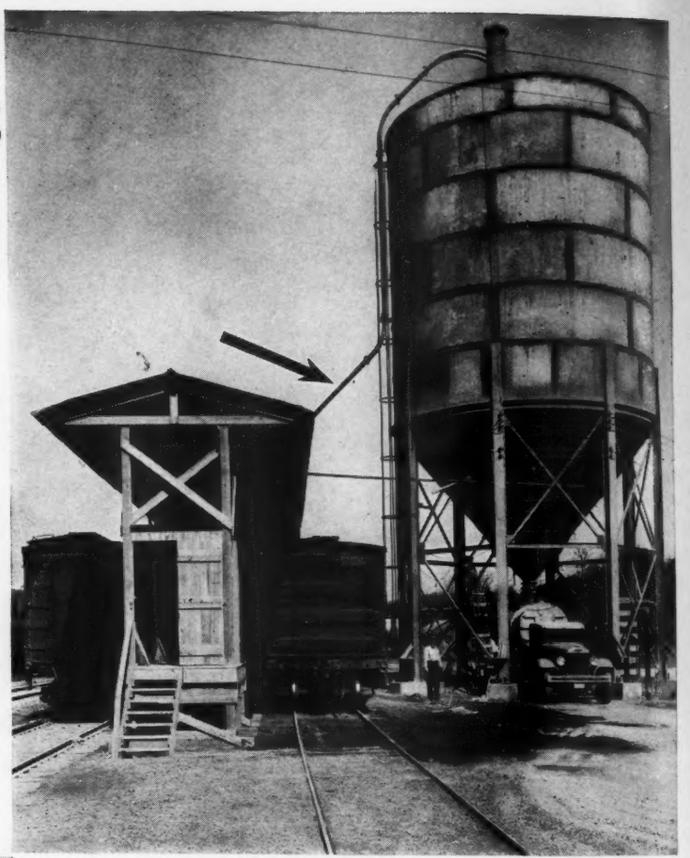
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THE CEMENT LINE TO MIXING PLANT

Two types of Fuller-Kinyon Systems handle the cement for this great project. Two portable pumps, unload box-cars and convey through independent pipe-lines to a truck-loading bin at the railroad siding. The arrangement, shown above, provides for the unloading of four cars without shifting. Special trucks transport the cement five miles to the mixing plant where the loads are dumped into a hopper above two stationary pumps. One of these pumps is for stand-by service, but is connected to the pipe-line system for instant use. Cement is conveyed either directly to the mixing plant, or through a branch line to storage. When trucks are not discharging, the cement is spouted to the same hopper for transfer to the mixing plant.

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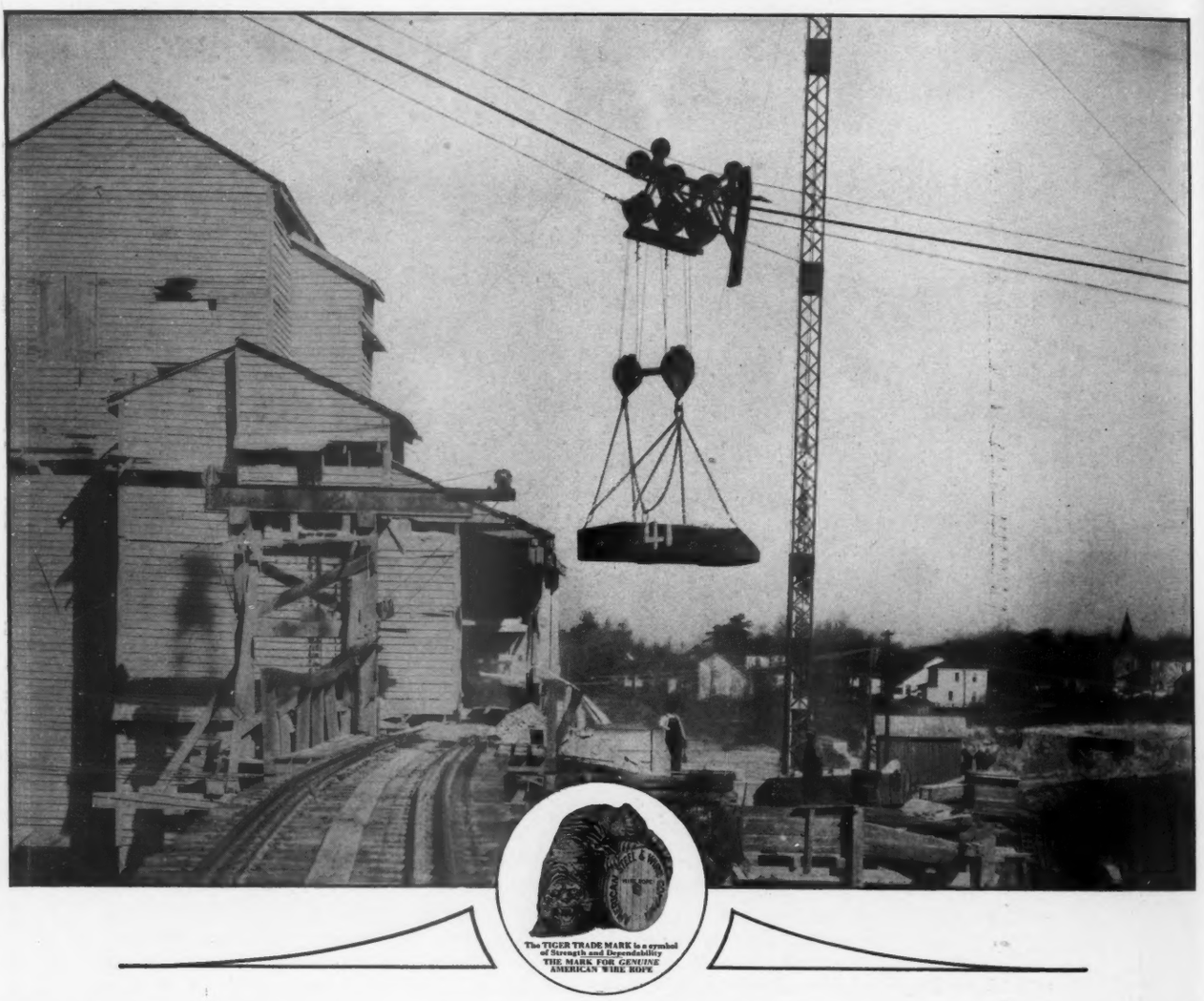
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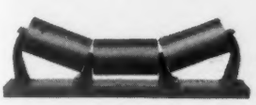
When he says . . .

"Stone thru a two-inch ring"

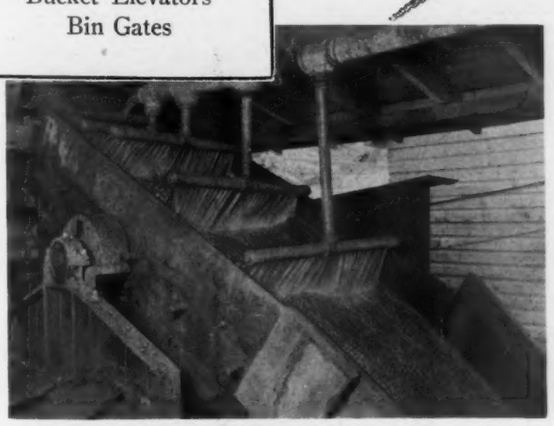




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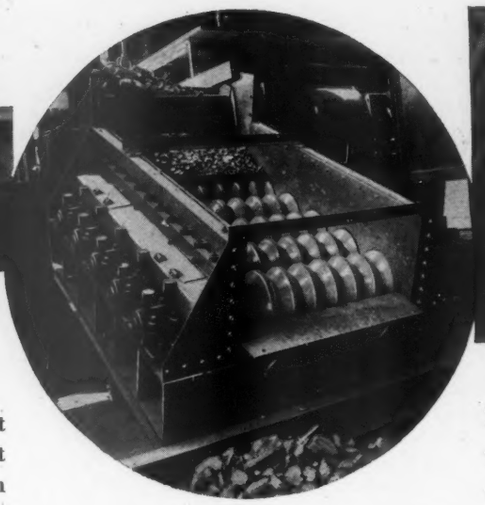
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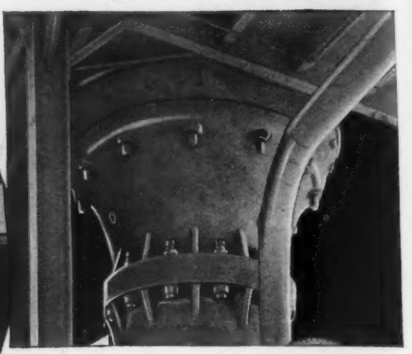
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Hungry Crushers . . .

"Making little ones out of big ones" is their job—*and your source of profit*







There are profits on "the rock pile"

Tonnage at the pit is one thing. But tonnage moving through the plant economically, without interruption or delays, is quite another!

That's where profits "at the face" turn to profits in the pocket. A crusher "down" for repairs, starves both plant and profits.

Steel jaws need tough lubricants

It takes a tough lubricant to stand up under the terrific pressures in heavy crusher bearings. Tons per square inch and the constant attack of dust and dirt and heat must be met by lubricants that are *right*.

Texaco Lubricants for crusher parts are scientifically refined especially for the work they have to do. Whether the bearings are oil lubricated or grease lubricated, you can depend on Texaco *tested* Lubricants for safer operation, more lasting satisfaction and power economy.

Little ones out of big ones all day long

Builders of crushing equipment—approve the use of Texaco Lubricants. Mine and quarry operators responsible for crusher operations say—"Texaco *tested* Lubricants mean cooler bearings, protection against dust, longer life, lower maintenance and repair costs."

They assure you of uninterrupted operation at peak capacity for as long as you require.

Take it away with an extra profit

You will find it profitable to talk to a Texaco man. He will show you the proof of extra dollars won—give you the names of some of the largest mine and quarry operations where Texaco Lubricants are saving money every day—show you how you, too, can benefit. Just write and ask for a representative to call.

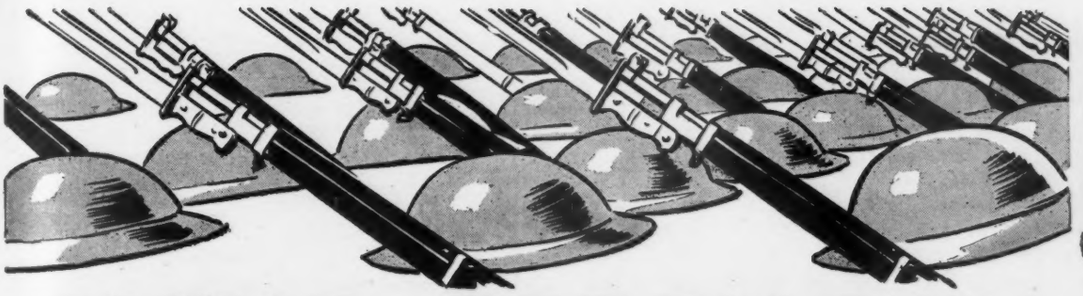
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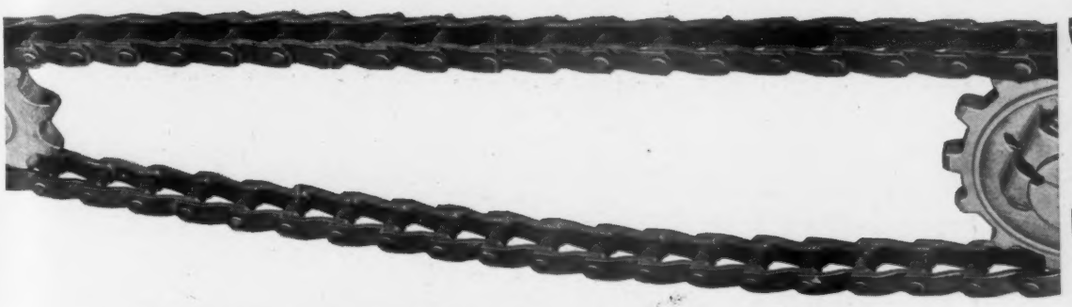


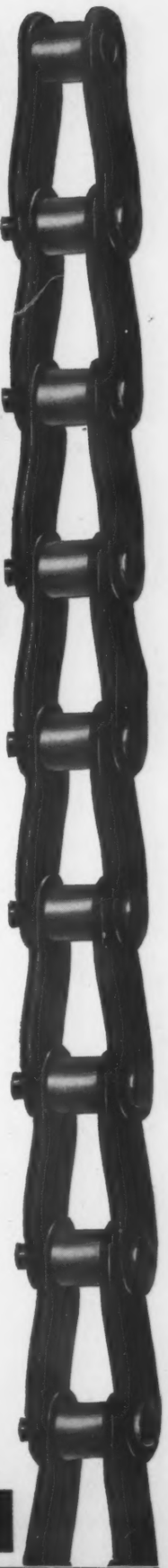
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In this line you will find the strength, the precision and the finish to meet every drive condition. All are built on the Rex Unit Link principle that means a chain that will be long lasting in the field—or in the plant.

If Chain were a new invention . . .

If chain were a new invention many new ways would probably be found for applying it—many new opportunities for economies and for improvements in many types of drives—in plants and on machinery—for its flexibility and range are almost unlimited.

Application Engineers of the Chain Belt Company are always available to help work out your drive or conveyor problems, with a complete line of standard and special Rex Roller Chains, 3/8 to 2½-inch pitch and 270 standard Rex Chabelco Steel Chains or any Special Chain your service may require.

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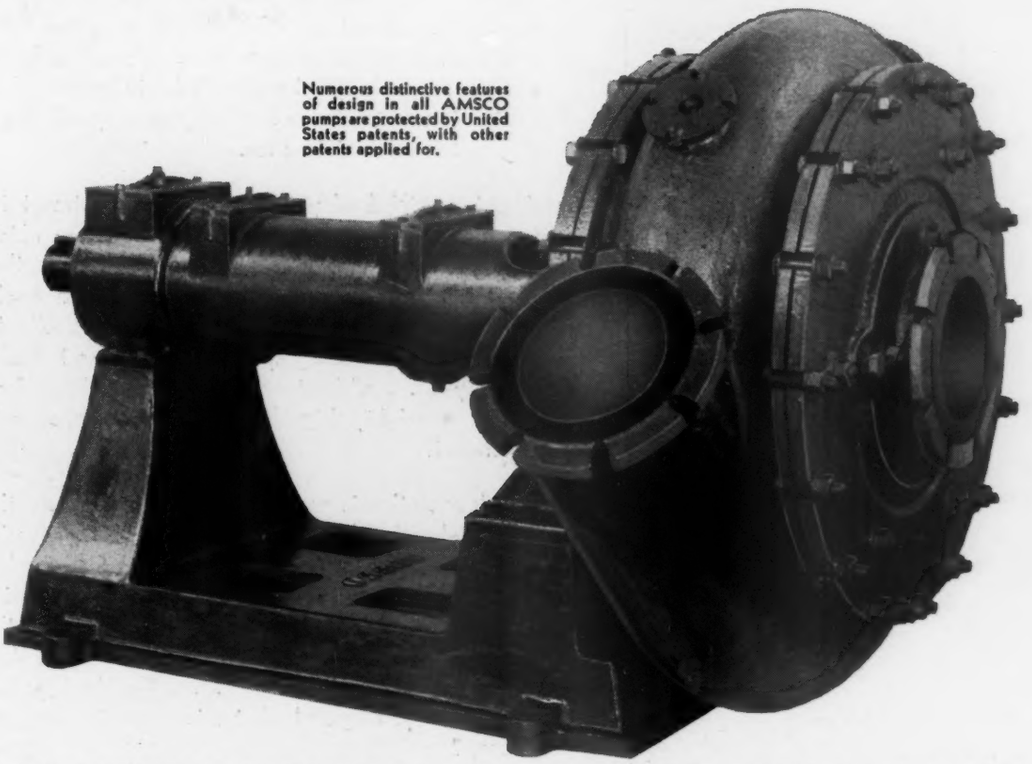


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An 8-inch AMSCO Type "I", Form 26 Pump, Bare Design, Left Hand, 45 degree Uptum Discharge, made for direct connection to an Internal Combustion Engine with the entire Equipment Mounted on a Sub-Structure Base.

AMSCO Type "I" materials handling pumps fully meet the needs of Industry for long-service pumps, in small sizes of lighter design and moderate price, for pumping and conveying abrasive materials under conditions not requiring the AMSCO standard and heavy duty dredge pumps.

They are made in 3-inch, 4-inch, 5-inch, 6-inch and 8-inch sizes, in standard horizontal shaft designs, for all types of drives.

Numerous installations of AMSCO Type "I" pumps are today in use, pumping sand and gravel, wasting sand in commercial aggregates plants, handling ashes in power plants; and in many other applications pumping mixtures of water and practically every abrasive material.

All water end wearing parts are made of analytically controlled, scientifically heat treated AMSCO manganese steel, the "Toughest Steel Known", which, being unequalled for its shock and wear resistance, assures long time, trouble-free operation.

All AMSCO pumps embody: sturdiness with durable construction and lasting efficiency; simplicity and accessibility; ease of replacement of wearing parts; and remarkably high capacity under severe head conditions.

For high head and general dredging pump requirements, we make a complete line of AMSCO heavy duty dredge pumps, of horizontal shaft design, in a complete range of standard sizes for every type of drive..

We invite your inquiry for performance data and application details on AMSCO Type "I" materials handling pumps, and will gladly furnish descriptive bulletin to interested parties. Write for details today!

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The "Depression" is no longer an excuse for old style equipment

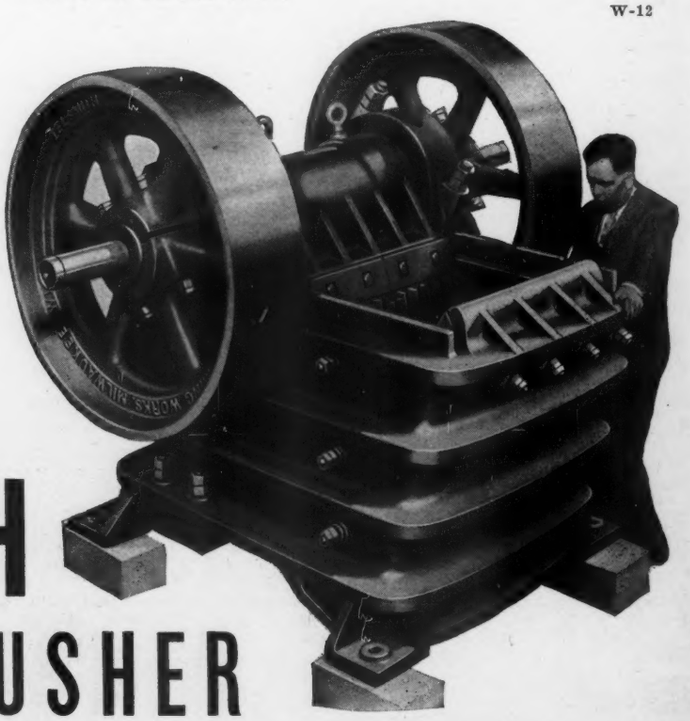
THE depression produced a psychology of price. The use of the now old fashioned plain bearing jaw crusher was based on price rather than value. The roller bearing jaw crusher . . . designed and built for today's needs . . . is the key to profits—in the form of greater speed, larger capacity and lower maintenance.

About one-third of your jaw crusher investment is in the frame and swinging jaw—massive steel castings which cost a lot of money and last indefinitely. In these parts, the investment is about the same whether you buy a crusher with roller bearings or a cheaper outfit. ***But***—the roller bearings permit higher crushing speed . . . almost double your capacity . . . without any greater expenditure for power. This is a mighty big dividend on the small additional investment.

There's one other important part in a jaw crusher—the shaft. In the Telsmith roller-bearing machine, all the wear is taken off this big steel forging . . . transferred to the hardened alloy steel races and roller bearings. Except for fatigue, the shaft is as good in its tenth season as when it left the shop. You buy new bearings at long intervals; but your shaft is an almost permanent investment . . . like the big steel castings. Have you figured what this means in terms of lower up-keep?

Add up these items—(a) bigger capacity (b) lower power consumption per-ton-crushed (c) less maintenance expense and (d) a crusher which, in its three important elements, is an almost permanent investment. Is it worth a little more money? We think so and a long list of users agree with us. Write for Bulletin W-11.

W-12



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The *new* Koehring Wheel Dumptor 70-5

for hauling • dumping • spreading • • • •



20 miles per hour

The new 5 yard KOEHRING WHEEL DUMPTOR is the modern *high-speed* self-contained load carrying tractor. *Twenty miles* per hour, either forward or reverse. This high travel *speed,* with *speed* at the loading point and *speed* at the dump, establishes the 70-5 Dumptor as the outstanding *high speed,* economical tractor-type dirt moving unit.

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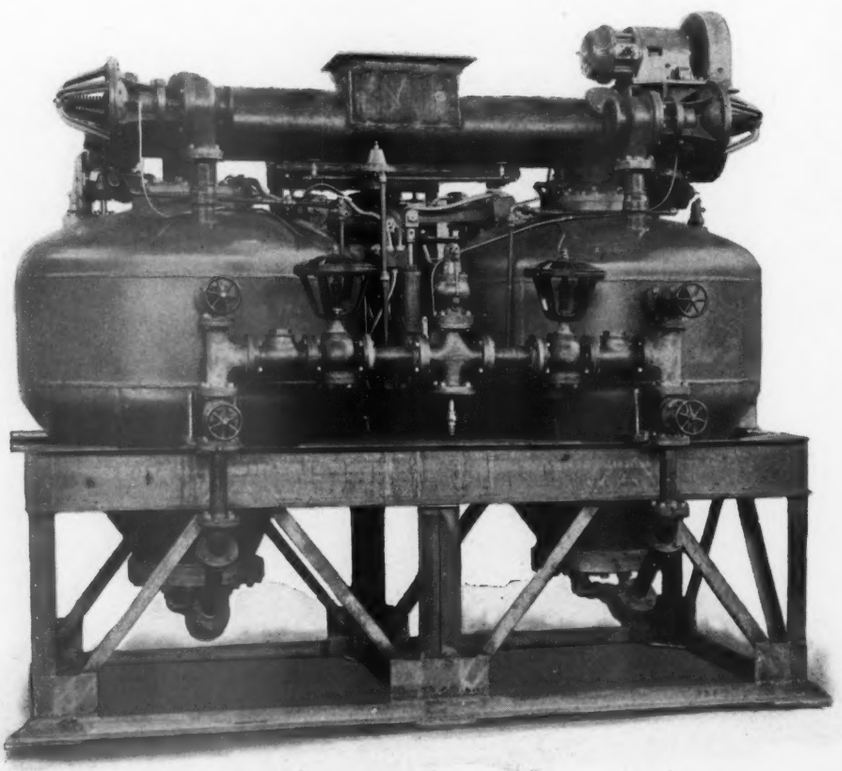
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and other pulverulent materials, pneumatically, over short or long distances, in small or large quantities

• THE FLUXO PUMP •

At Boulder Dam, a large size Fluxo Pump has transported cement more than one mile at the rate of about 85 tons per hour; and for a distance of 200 feet with vertical lift of 130 feet, at the rate of about 250 tons (1350 barrels) per hour.



Single or double tank. Stationary or portable. Gravity or suction feed. Automatic and flexible, low power consumption, minimum attention. No operating parts in direct contact with the moving material. Economically transports cement, pulverized dry cement raw mix, dry clay, gypsum, hydrated lime, phosphates, soda ash, etc.—from grinding mills to storage—dust collected at packing machines to silos—loading and unloading silos, storage bins, blending bins, etc. The suction-feed Pump permits cheaper silo construction by elimination of tunnels and deck slab.

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Engineer Specialists in Designing and Equipping Cement Making Factories

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Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII Chicago, April, 1935 Number 5

Recovery Progress—Trends—Editorial Comment

PROBABLY the most significant development in connection with NRA during March was the announcement that the Government would drop its case against Belcher, Alabama lumber-mill operator (ROCK PRODUCTS, February, 1935, p. 21), which was soon to come before the United States Supreme Court for a fateful decision involving nearly all the fundamentals of the National Industrial Recovery Act. This case had come up from the Federal District Court at Birmingham, Ala., which refused to enforce the lumber industry's code—even the labor provisions—on the ground that NIRA was unconstitutional; that interstate commerce was not involved. The excuse given by the U. S. Department of Justice for refusing to go on with the prosecution was this:

The case arises under an indictment charging violation of provisions of the Lumber and Timber Products Code. This Code was among the first approved, at a time when the Lumber Industry was in great distress and the NRA was in the early stage of its development. Consequently, while sound in general substance and in purpose, this Code contains administrative provisions peculiar to itself with respect to the extension of discretionary powers to non-governmental agencies—a fact which was emphasized many times in the recent Senate Committee hearings and which sets this Code in a class by itself. Revision of this situation is, the Department is informed, now under consideration by the National Industrial Recovery Board. In any event, this feature is expected to be eliminated under the new legislation as recommended by the Administration. A further unsatisfactory feature in this case is that, due to the nature of the action, no findings could be made by the lower court. The Department feels that the fundamental questions involved in the National Industrial Recovery Act should be presented to the Supreme Court in a case in which full evidence of the facts has been given. Other cases in which these objections do not exist are being pressed in several of the Circuits in order that decisions of the Appellate Courts may be secured as soon as possible.

Donald Richberg (center) defends NRA before U. S. Senate Finance Committee *Acme Photo*



Meanwhile and pending desirable amendments to the Lumber and Timber Products Code, there will be no relaxation in the enforcement of other codes. United States Attorneys are being so instructed.

Obviously the Government is sparring for time and could not afford to risk an adverse decision which would practically have put an end to NRA. There was no attempt, apparently, to side-step this admission; orders are said to have come from the White House and the reason given there was that this decision to abandon the case was along the line of policy laid down when NIRA was enacted, first suggested by Donald Richberg, and Prof. Felix Frankfurter of Harvard University law school, that a Supreme Court test should be held off until a solid background of achievement had been built up—or in other words until public or industry sentiment was more solidly behind the NIRA and the codes.

Self-Government Not Dictatorship the Aim

We believe most of the thoughtful members of the rock products industries will agree that this is a wise step in spite of the immediate reaction; and, if they have read Donald Richberg's speeches and articles as thoroughly as the editor has, they will agree that it is thoroughly in line with his ideas regarding NIRA and the codes. For example, in the March issue of *The American Magazine,* in response to very pointed questions by an interviewer, Mr. Richberg said:

> We are trying a voluntary system. It is a middle-of-the-road policy, of course. We think it is an American one. We think there is all the difference in the world between it and the systems of Italy and Russia. It is the difference between [Government] running business and [Government] supervising self-government [in business]. We are trying the latter. . . . . I'm not willing to scrap the Constitution. I have not the faintest idea that it is necessary. But I'll say this: If you let millions remain out of work for very long, they may try to do some scrapping for themselves. . . . . NRA was an experiment in industrial self-government. We must now admit that private business is not adequately organized for self-discipline and unified action. . . . . It would be sheer suicide to give up the gains made by NRA.

Rock Products has always thought that Mr. Richberg's views regarding NRA and the codes were sound and described accurately the basic philosophy behind them; we have tried to point out over and over again, as V. P. Ahearn did on his recent visit to the West Coast districts under the Code for the Crushed Stone, Sand and Gravel, and Slag Industries, that NIRA and the codes are *charters of self-government,* and not another prohibition act—that only force of industry opinion, the voluntary adoption of fair practices by a great majority of the industry, would ever make NIRA and the codes really effective, or make them accomplish what they are designed to accomplish. Consequently, while those opposed to NRA and the codes will make much political capital out of this seeming retreat of the government from a real test of NIRA, all that is actually being done is to try to give industry a while longer to work out its own salvation if it can.

Recalling Some Distinctions

Title I of the NIRA should never have been tied to Title II, making the whole "emergency legislation." Title I is the natural evolution of a generation's experience with trade and industrial associations, a natural and expected step in the direction of industrial self-government. It is not "emergency legislation" in any sense, and the tying of it into one act of Congress with Title II, which provided ways and means for emergency public works was unfortunate. This two-year, emergency character of NIRA accounts for a great deal of the uncertainty and lack of confidence on the part of industry today.

Title I of NIRA is different in many important respects from all previous federal legislation in regard to industry. The earlier acts such as the Interstate Commerce act and the anti-trust acts were all prohibitory in character. They define things that industry must not do, for the protection of the public interest. There is hardly any doubt as to their effect in improving business morality and of their having served a useful purpose. But because of their prohibitory character, the regulatory bodies, the Interstate Commerce Commission and the Federal Trade Commission, have concerned themselves chiefly with suppressing industrial initiative. Their attitude has been that of detectives and policemen ever ready to discourage and condemn all attempts of business and industry to meet and solve economic problems collectively through coöperative associations.

Their attitude changed somewhat with the more recent decisions of the United States Supreme Court, some ten or twelve years ago, in cases such as the so-called "cement trust case," which recognized that trade associations through the collection and use of their trade statistics could perform a real service to society in stabilizing their industries. Further progress was made during Herbert Hoover's terms as Secretary of Commerce and President, when various trade associations, including the National Lime Association and National Crushed Stone Association, adopted voluntary codes of ethics. While these codes failed to accomplish very much of tangible value, they certainly paved the way for NIRA, and something like NIRA was expected by nearly all industry if Herbert Hoover had been reelected.

So while it is generally assumed the Title I of NIRA was handed out to industry by the present administration as a bid for support of the New Deal, actually it was bound to come sooner or later as a natural sequence to what had gone before. For the same reasons it is inconceivable that the fundamentals of NIRA will be abandoned, even though it has fallen far short of the expectations either of industry or the administration.

Difficult to Get Oriented

Title I of NIRA is both evolutionary and revolutionary in that it is permissive—constructive—industry is given the right, in fact the duty, to organize for the purpose of stabilizing wages and prices, with the idea that through such stabilization the humps and hollows of our economic, business volume and financial charts might be evened out. Because of this revolutionary character it has been difficult for both government and industry to orient themselves—to really grasp its true character.

The stabilization of hours of work and rates of wages

seems to have met with a fair degree of success and we find little or no opposition on the part of any employer to giving his employes every possible break. It is doubtful in this day and generation if any employer *wants* to reduce costs at the expense of paying starvation wages or of long hours of labor. Nor do they want to be driven to it.

The stabilization of prices is quite a different thing, and the attempt to achieve it has led to much misunderstanding and much misinformed opposition to the codes of various industries, including those of the crushed stone, sand and gravel, and slag industries, of the cement industry, and many others. The misunderstanding arises chiefly from a lack of appreciation of certain cost elements of individual enterprises which neither government nor industry can control—as we tried to make clear in our March issue of Rock Products. These make it practically impossible to place a minimum price on any commodity, which would be fair for any length of time, or to the varying conditions and localities met with in industry.

The public, and probably the administration officials, are prejudiced against business and industry because many previous efforts in the line of coöperative associations of business men have been openly or secretly to get prices as high as traffic would bear. Perhaps some business men and industrialists embraced the NIRA and the codes because they thought they would allow price stabilization on that basis. But that certainly was not the idea of the leaders in the industries which Rock Products serves.

Real Statesmen of Industry in the Making

According to our observation, the NIRA has had just the opposite effect. The unselfish, unremitting labor we see given by the members of some of these code authorities to solving the problems of these industries, not by any means from a purely selfish viewpoint, nor even from the viewpoint of these industries alone, but with a sincere regard for the underlying purposes of NIRA and the public interest, have convinced us that we are developing in this country through their work in code administration, budding statesmen of industry. These men who know economics, not from a study of general statistics and theorizing, but because they actually make the statistics of their own industry, understand them and use them, intelligently, will eventually prove far more useful in administrative government than well-meaning but inexperienced college professors of political science.

It is to be hoped that in the not far distant future some of these men will become so prominent through their services to industry and the public that the President will be forced to recognize this distinction by appointment of such men to one or more positions in the Cabinet, which today seems sadly lacking in competent advisers on business and industry. Also, it is hoped that training on code authorities, or in industrial associations, will lead to prominent men of industry seeking to serve the public through political office throughout the land, for men of industry, who know how to serve the public interest would be valuable assets to any legislative body.

We blame the NRA for not giving publicity and credit to some of these accomplishments and for not defending certain industries before the public. By doing so, with the authority behind NRA, much adverse criticism and misunderstanding, not only of industry, but of the NRA itself, would have been avoided. A good example of how far wrong public opinion is on many phases of NIRA is some recent comment in his column "Today and Tomorrow" by Walter Lipmann, who is usually a reliable commentator.

Sample of Misinformation

Under the caption "Monopoly," Mr. Lipmann said:

It is interesting to ask ourselves why the experiment in "self-government" for industry has worked so badly. The essential reason, it seems to me, is that the men who represented industry, labor and the administration, in carrying out the experiment, were all bamboozled by the same fallacy. The NRA control of industry has gone wrong because the business executives, the labor leaders and the officials had a wrong conception of what to do with their power. Unintentionally, but none the less effectively, they have used their power to depress trade and to prevent employment.

Among the business executives the basic fallacy took the form of attempting to deal with "cutthroat competition" by holding up prices. The codes, which the businessmen wrote, have been based in most instances on the principle that it is better to sell less goods at a high price than more goods at a lower price. Among the labor leaders who had a hand in the NRA this same basic fallacy took the form of attempting to increase "purchasing power" by raising the hourly price of labor. The A. F. of L. executives have preferred a small volume of employment at a high hourly wage to more employment, and therefore more income, at a lower hourly wage.

As for the officials, they consented to, and even encouraged, both fallacies, They approved wage policies which raised

Let every employer and employe remember they are still the controlling majority in this country!



Courtesy of "Chicago Tribune"

hourly rates and, therefore, restricted employment. They imagined that they were fighting cutthroat competition and the sweating of labor when, in fact, they were making it difficult for business to sell its products and to re-employ labor.

The industrial plant that could not find a market at the high prices is a dead weight which obstructs the revival of investments. The labor which cannot be employed because unit prices of goods and hourly rates of wages are too high is living on its savings or is on the relief roll.

The fixing of a price which restricts the sale of goods or of labor is the essence of monopoly. In attacking monopoly the senators have at least located the evil. It must be said, however, that men like Senator Borah and Senator McCarran who attack monopolistic price-fixing and yet vote to sustain monopolistic wage-fixing are blind in one eye. Those who attack monopolistic wage-fixing but are silent about price fixing in, let us say, for example, steel and cement, are blind in the other eye. The basic evil of NRA has been not that it controlled industry, but that it controlled it on the monopolistic principle of restricting production and employment in order to support high prices and high hourly wages.

We Tried to Avoid Further Deflation!

Of course this is a straight out-and-out argument for *deflation* of wages and prices (which naturally go together), the very thing NIRA was designed to avoid. It was hoped by nearly every one when NIRA was enacted that the theory so long cherished that we *had* to hit the lowest point of deflation before inflation (or prosperity) started was all wrong and that it was in the power of organized industry to arrest deflation somewhere short of the bottom and start things up again. Mr. Lipmann, at least by inference, admits that industry has done this; yet because it resulted in *uniform,* not high or unfair, prices, the result has been monopoly. Of course nothing could be farther from the truth, yet such stuff as Mr. Lipmann is writing here is actually shaking public confidence in NRA, and in whatever success it has achieved toward the accomplishment of its avowed purpose. We suspect that it has shaken the confidence of NRA in itself, or it would have capitalized its real progress in *preventing destructive deflation.*

Code Developments

THE CODES of the cement, crushed stone, sand and gravel, and slag industries can be, and in general, are being enforced regardless of court action or lack of action, because nearly all construction today involves the use of PWA money, and the Government can and does refuse contracts to those who fail to comply with codes. In this respect the rock products industries are fortunate.

Now comes a case, however, in which the U. S. Supreme Court will have to decide whether the Government can legally do this. The new test came when the W. Ames Co., New Jersey steel manufacturer, filed a case with the Supreme Court charging that the NRA was unconstitutional. The company's particular complaint was that the Government had barred it from federal contracts merely because it did not have the blue eagle of NRA. The company charged that NRA had no right to regulate employer-employe relationships since these relationships were not a matter of interstate commerce. The Ames case probably cannot be heard until next fall.

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Following fast upon the announcement that the U. S. Department of Justice would drop its case before the Supreme Court against Belcher, the Alabama rebel lumber operator, for fear an adverse decision would wreck NRA, the President announced:

"There is no excuse whatsoever at the present time for members of trade and industry who have sponsored and are subject to these codes to fail to give them wholehearted support.

"Nor can there be any justification for any bad faith involved in attempting to lengthen hours or reduce wages contrary to code requirements.

"I am particularly requesting the Department of Justice to give every assistance in maintaining compliance with the codes and in advising the district attorneys throughout the country to take prompt and vigorous action to prevent or to punish such violations."

This may appear inconsistent, but there are still plenty of ways Uncle Sam can make it unhealthy for code violators. He can at least make it costly for violators to defend themselves in the lower courts.

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Donald R. Richberg, acting chairman, National Industrial Recovery Board, says:

"Every agency of human progress from the wheelbarrow to the airplane and from a tribal council to a republican form of government has been opposed and scoffed at by the tired old men and the young-men-in-a-hurry of every generation. The tired old men are sure you can't re-make human nature. The young-men-in-a-hurry think you can reform human activities by setting up new systems over-night. But the fact is that aggressive, mature men and women of imagination, by steadily improving human mechanisms of coöperation, steadily advance the level of civilization.

"The NRA has the greatest possibilities of helping to develop an industrial civilization that will not enslave, but will set free, the masses of the people from tyrannies that have oppressed them throughout history. The progress made in two years in building a better, safer, fairer, industrial structure has been enormous. The man who would give up the effort and smash the machine is the same type of man who one hundred years ago wanted to prohibit railroads, and thirty years ago was denouncing automobiles, as dangerous and destructive experiments contrary to the 'natural order of human existence.'"

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The foregoing, and many other comments in the daily press, make it clear that regulation of business and industry by the Federal Government is not so much a problem of policy as of the power of the Federal Government under our Constitution to do much of anything. In renewing or revising NIRA, Congress itself is faced more with the question of its own authority than with the question of what ought to be done. Hence, the great need for a strong backing of industry and of public opinion.

Donald Richberg brought this out in his testimony before the Senate Finance Committee when he said:

"Those who have not recognized the necessity for such a gradual development of industrial law do not understand that the validity of a large part of our law depends upon the support of public opinion. When the Supreme Court is called upon to answer the question, 'Is this law a reasonable exercise of a power clearly conferred,' it is not the individual opinion of a single judge, but the preponderant public opinion, which should be decisive.

"The power of the Federal Government to regulate interstate and foreign commerce is explicitly granted. This includes not only the power to regulate transportation and commerce between the States, but the power to regulate those activities within a State which necessarily restrain, destroy, or otherwise substantially interfere with and affect interstate commerce. How can we determine the extent to which unfair competitive practices in the various trades and industries detrimentally affect interstate com-

merce? In case after case the Supreme Court has made it clear that the determination of the validity of a regulation of interstate commerce must rest upon the factual situation and the reasonable conclusions drawn from the facts by those having practical intimate knowledge of them."

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Many manufacturers of specialties, such, for example, as the machinery supplied to producers in these industries, consider NIRA and the codes an abomination, but they should not attempt to argue that they are useless to the producers of basic standardized commodities, for all evidence is to the contrary. Probably codes should not be forced upon any industry, a majority of which does not want one; but, on the other hand those who have found them helpful in promoting stability and buying power should not be deprived of them; and a way should be found to make them more effective.

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Complaints against the codes have come chiefly from small business men. They think they should be an especially privileged class, in many cases. They think they should be allowed to pay smaller wages and sell their products for less money than their bigger competitors. This complaint comes often because they know of no other way to get business, while their larger competitors know how to merchandise quality, service, reputation, etc. But the big producer need have no monopoly of quality, service, reputation, etc., as many a live-wire small producer has proved. Moreover, recent developments and wider outlook should have taught the small producer that through coöperation with other small producers he can organize to give all the service of his bigger competitors. The possibilities in this direction have hardly been scratched.

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Code Authorities Pay No Income Taxes

Under a ruling of the Commissioner of Internal Revenue, announced March 13, code authorities are entitled to exemption from federal income taxes and from filing returns therefor. This ruling was issued specifically in the case of the Paint Industry Recovery Board, Inc., and the Folding Paper Box Code Authority, which is not incorporated. The Commissioner of Internal Revenue granted exemption to those two groups and in his ruling stated that other code authorities performing the "same character of functions" would be entitled to similar exemptions.

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Crushed Stone, Sand and Gravel and Slag Industries

Administrative Order: 80-244-53A, extending for a period of 90 days exemption granted in Administrative Order 109-52 to all contractor-producers producing sand, gravel, and/or stone for public highway construction purposes for use of projects where such contractor-producers have bona fide construction contracts in their own names, and where the production of sand, gravel, and/or stone by the contractor-producers is from lands either owned in fee simple or controlled by license with rights of "profit a prendre," easement, or by a bona fide publicized lease with rights of "profits a prendre," by Federal Government, State government, or political subdivision thereof.

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Order 109-85, denying exemption from the provisions of article IV, section 1, to Jacob F. Masmer, R. F. D. No. 5, York, Penn.

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Producers of South Carolina (Part of Region 5) have reëlected members of district committee as follows: G. D. Lott, Palmetto Quarries Co., Columbia, S. C. (Chairman); R. S. Campbell, Holston Quarry Co. of South Carolina, Knoxville, Tenn.; D. E. Saunders, South Carolina Granite Co., Columbia, S. C.; R. L. Kerr, Jr., William M. Bird & Co., Columbia, S. C.; W. R. Bonsal, Lawrence Stone & Gravel Co., Raleigh, N. C.; John Wilson, S. W. Wilson & Sons, Inc., Columbia, S. C. (Secretary); C. A. Barinowski, Birmingham Slag Co., Birmingham, Ala.; C. E. Ireland, Birmingham Slag Co., Birmingham, Ala.; G. A. Mattison, Woodstock Slag Corp, Birmingham, Ala.

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F. T. Yow, Greensboro, N. C.: Blue Eagle withdrawn for violation of open price provisions of code.

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Slate Industry

Hearing held March 25 on revision of code: Amendments of the code definition, administration section, price filing, trade practice and general labor provisions have been proposed by the Code Authority.

The definition would be broadened to include dealers who handle slate exclusively and who in the Code Authority's view should be under the slate code. The amendment would add assembling and fabricating to the processes covered by the code, and would amplify the present provisions for inclusion of producers' agents.

A new price filing section would reduce the waiting period between the filing and effect of prices and terms from ten to five days. The code's prohibition of sales below cost would be deleted and a section providing emergency declarations of minimum prices upon recommendation of the Code Authority and approval of NRA would be added to the revised trade practice rules.

A proposed change in the administration section would substitute mandatory budget assessments for the present provision for voluntary contributions. Other changes would require members of the industry to keep complete trade data available for Code Authority study, and would empower the Code Authority to check any records subject to doubt of their accuracy.

The present prohibition of consignment selling in the trade practice rules would be modified to forbid consignment sales "except where peculiar circumstances of the industry may require the practice."

Another proposed change would permit members of the industry to enter into an agreement to pay liquidated damages for code violations. The agreement would be effective only upon approval of NRA.

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Sand-Lime Brick Industry

Code Authority has made application for approval of its budget for, and of the basis of contribution by members of the industry to the expense of administering the code for the period from April 1, 1935, to December 31, 1935. The total amount of budget for the period is $1395. The basis of contribution is as follows: Assessments are based on estimated sales of 38 millions standard size brick or equivalent units for one year's period. The Code Authority shall assess each member of the industry monthly on the basis of five cents per thousand for standard size brick (8x2¼x3¼ in. approximately) invoiced, and fifty cents per thousand for 8x8x16-in. size block invoiced. For brick invoiced of other than standard size, assessments to be made in the proportion that the plant selling price per thousand bears to the plant selling per thousand for such standard size brick. For block of other than 8x8x16 in. size, assessment to be made in the proportion that the unit selling price of such block bears to the unit plant selling price of the 8x8x16-in. size. The Code Authority is to assess each member of the industry monthly, on the basis of his sales for the preceding month, beginning with the first day of April, 1935.

Code Development in Cement Products Industry on Page 67

Cement Industry

Statistics: The portland cement industry in February, 1935, produced 3,053,000 bbl., shipped 2,952,000 from the mills, and had in stock at the end of the month 21,948,000. Production showed a decrease of 26.8% and shipments no change, as compared with February, 1934. Stocks at mills were 5.7% higher than a year ago. The statistics here given are compiled from reports for February, received by the Bureau of Mines, from all manufacturing plants except one, for which an estimate has been included in lieu of actual returns. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of February, 1935, and of 163 at the close of February, 1934:

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	February,		Jan.,	Dec.,	Nov.,
	1934	1935	1935	1934	1934
The month....	20.2	14.9	14.1	19.5	26.2
The 12 months ended	24.4	28.4	28.8	29.0	28.7



Trial Burning of Cement Raw Materials

By A. E. Hiscox

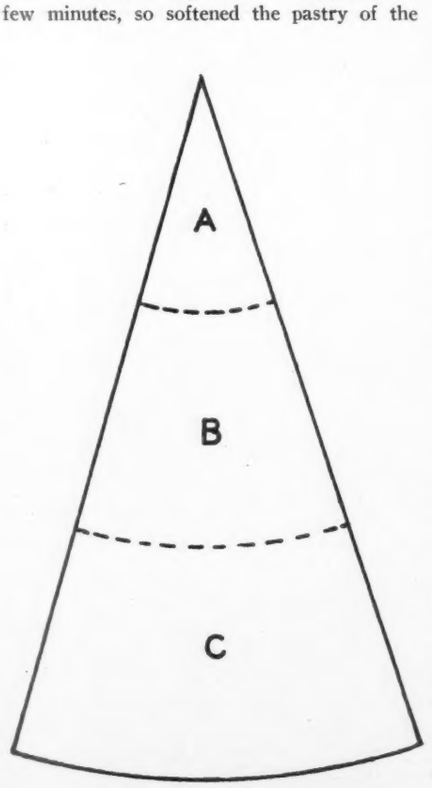
THE CHEMIST of a cement mill very often wishes to ascertain the effects on the quality of product of various changes in raw materials, modifications of certain steps in the process, and so on. It may not be either feasible or advisable to try out such changes on a mill scale, because the quest for facts, even though laudable, may lead to disastrous results somewhere in the processing line. Inasmuch as the "neck of the bottle" in a cement mill is usually the kiln, if the chemist had a dependable method of small-scale burning available, much valuable data could readily be secured, without upsetting the plant schedules.

Trial burning has been in use for many years in the laboratory. Many methods have been used, such as crucibles, shaft kilns, rotary kilns, etc., and some of these methods have given good results. Too often, however, it has been difficult to reproduce a given set of burning conditions. In recent years the Portland Cement Association, in conjunction with the Bureau of Standards, has set up a gas-fired rotary kiln, with the object of observing effects of compositional or processing changes. Much valuable data has been derived therefrom.

This article has to do with a somewhat unusual method of trial burning and, principally, some of the results attained, as an indication of the use to which the trial burning method of investigation may be put.

A stationary, gas-fired tunnel kiln was available, instead of a rotary unit. The material to be burned was passed slowly through the kiln, while the temperature was raised gradually until the desired maximum was reached. Temperature control was perfect and any given set of conditions could easily be reproduced. Inasmuch as temperature of burning, speed of travel, or any other factors, could be readily duplicated, it was possible to ascertain the full effects of any changes in composition or processing on the quality of the resulting cements. More important still, the kiln was sufficiently large that any number of mixes could be put through simultaneously, thus avoiding even a slight possibility of the burning conditions being altered for any one mix.

Perhaps the most unusual feature of these trial burns was the shape of the mix mold. Small-sized ice cream cones, such as can be purchased in any confectionery, were used for this purpose. In grinding the raw mix the water content was kept low enough so that the resulting slurry was little more than a heavy paste and in this condition could be readily molded into the cones. Before filling the small end of the cone was snipped off so as to permit complete filling. After the cones were prepared they were placed on their bases in a dryer. The heat, after a few minutes, so softened the pastry of the cones that they could be readily stripped, leaving the molded piece ready for final drying.



FREE LIME

A - 0.20
B - 0.50
C - 0.80

After the cones were completely dry they were placed on their bases in saggers, the bottoms of which were covered with a layer of screened clinker. The cones entered the kiln at an initial temperature of 150 deg. F., and as they were conveyed through it, this temperature was raised to correspond to rotary kiln practice, as nearly as possible.

It is natural to assume that the lower section of the burned cones, from their greater volume, would be less completely burned than that section immediately below the vertex. This is true, but with careful regulation of the time and temperature element, the cone could still be thoroughly burned. To check this point, however, several cones from one of the burns were cut into three sections, each lot of similar sections composited, and free lime determinations made. The results are shown in the accompanying sketch.

This relation of the different degrees of burning, in each section, will be constant for all burns and hence exact comparisons can readily be made.

In making up a trial burn a sufficient number of cones were molded to give about 20 lb. of finished cement, which permitted the completion of all routine tests except those in concrete.

This, briefly, is the method followed in making the trial burns. Some of the results obtained were so interesting that they are given here, to show the possibilities of the trial burning method of experimentation. Although this method of trial burning is somewhat crude and departs considerably from rotary kiln practice, it has the distinct advantage of perfect temperature control. Furthermore, any number of burns can be put through simultaneously, thus eliminating all variables which might interfere with a true comparison. After all, clinker burning is essentially a means of promoting certain well known and desirable chemical combinations of the different compounds in cement.

Comparison of Results With Rotary Kiln Practice

The results attained by burning in such a kiln or furnace can readily be checked against the plant kiln. In Table I there is shown such an actual comparison. A generous sample of the raw mix entering the kilns was taken hourly over a period of 24 hours and composited, dried to pasty consistency, molded, and burned at the same temperature as usually found in the plant kiln. At the same time the clinker stream from the plant kiln was sampled hourly and composited. Both samples of clinker, one burned experimentally and the other in the plant kiln were then ground into cement by the same number of revolutions of a 20x24 in. test mill, the usual amount of gypsum, of course, being added as a retarder of the set. Tests of the two cements follow:

TABLE 1—TESTS OF CEMENT MADE IN TRIAL BURNING FURNACE AND IN ROTARY KILN

Cement	% Finer Than 200-Mesh	% Finer Than 325-Mesh	Tensile Strength 20 Micron	Tensile Strength 3 Days	Tensile Strength 7 Days	Free lime, percent
(1) Trial burned	93.8	82.4	50.4	314	398	0.70
(2) Plant burned	94.2	81.7	49.2	299	386	0.80

Thus it will be seen that this trial burning method approximates closely, as measured by the final cements obtained, actual burning practice in the mill. The thoroughness of burning seems to be very slightly in favor of the trial burning; but the difference is so small that for all practical purposes, the two methods may be said to agree. Of course, in the plant kiln burn, if coal is used for fuel, the ash of the fuel partially enters the clinker composition. Even this variation may be overcome, if so desired, by adding a predetermined amount of the ash to the trial mix before it is burned.

Possibilities of Method

To further show the possibilities of this method, in Table 2 is given a record of tests made on cements produced from six trial burns put through simultaneously. The results will serve to show the nature of the information that can be secured by trial burning. Materials may be changed, steps in the process may be varied, changes in composition made—the effects of any of these can be studied through this experimental method.

The temperature of burning, that is, of clinkering, for the six clinkers, was 2642 deg. F.

A study of the above data will show the value of the method. When these trial mixes were made up and burned, certain information relative to materials was needed, and after completion of the burning and testing, the required data were fully obtained.

The stationary kiln, of course, presents some problems that would not be encountered in a rotary, used for the same purpose. However, if proper allowances are made for the existing differences, the facts established by the burning will be of great value and well worth the time and effort spent to secure them.

Cement News

Lehigh Portland Cement Co., Allentown, Penn., recently announced a new dealer policy, effective at once, as follows:

Efforts to secure approval of the marketing provisions of the Code of Fair Competition for the Portland Cement industry have thus far produced no definite results. The prospects for early settlement of this very important matter are not encouraging.

Numerous requests have been received from dealers for a declaration of sales policy, and in answer to these requests we set forth below the policy which will hereafter be followed in the distribution of our products.

Lehigh cements will be sold to and through dealers, except for the following buyers, whom we will sell direct:

1. The United States Government and State Governments.
   (Provided that cement for work of Federal relief agencies located entirely within cities, towns or villages will be sold through dealers.)
2. Counties and parishes.
   (Provided that contractors on county or parish bridge and culvert work, awarded separately from highway contracts, will be sold through dealers.)
3. Railroads filing tariffs with State or Interstate Commissions.
4. Water power and water supply developments, flood control and irrigation projects, except when such work is located entirely within cities, towns or villages.
5. Contractors doing any of the foregoing classes of work, except where such work is located entirely within cities, towns or villages.
6. Manufacturers of concrete and cement products, for their own manufacturing operations but not for resale.
7. Commercial concrete mixing plants, at their regularly established places of business, for their own processing operations, but not for sale.

Publications Received

Accounting System and Office-Management Procedure for Medium-Size Metal Mines. Bulletin 372, by A. E. Keller, published by the U. S. Department of Commerce (Bureau of Mines) for sale by the Superintendent of Documents, Washington, D. C., price 10c. This issue is published to encourage adoption of more efficient accounting systems and office procedure throughout the entire mining industry. A very detailed system is discussed which is particularly adapted to the needs of medium-size mines that ship their crude ore direct to smelters or to ore-purchasing companies without processing or treatment.

TABLE 2—RECORD OF TESTS OF SIX TRIAL BURNS.

A—Physical Tests

Cement No.	Raw mix, fineness— 200-mesh	Finished Cement — Setting time: Initial	Finished Cement — Setting time: Final	Fineness — finer than* — 74	43	25	20	10	Soundness, 5 hrs. steam
1	94.4%	2:55	4:25	96.0	88.4	77.9	71.7	42.4	OK
2	89.6%	1:55	3:00	92.0	86.0	78.6	73.4	43.5	OK
3	91.4%	1:35	2:20	94.4	88.0	76.6	70.7	45.0	SOFT
4	94.8%	2:40	4:20	94.8	87.2	72.1	70.4	41.2	OK
5	94.4%	2:15	4:10	92.8	87.4	76.9	70.9	41.5	OK
6	94.7%	2:00	3:50	96.0	88.8	80.6	72.8	48.8	OK

*In microns.

B—Tensile Strength Tests

Cement No.	Age in days 1	3	7	28
1	338	394	451	496
2	318	348	396	469
3	345	338	404	390
4	372	411	455	514
5	327	382	436	450
6	377	431	513	531

C—Chemical Analysis

Cement No.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3	Loss	Free CaO
1	20.15	5.86	3.53	62.44	3.42	2.90	1.18	0.10
2	19.81	5.76	3.41	62.90	3.53	2.94	1.20	1.20
3	19.01	5.48	3.39	64.19	3.46	2.98	1.10	3.90
4	19.23	5.77	3.80	63.59	3.37	2.90	0.90	0.60
5	18.85	5.76	4.93	63.09	3.35	2.91	0.60	0.30
6	19.79	5.69	3.38	63.64	3.40	2.98	0.96	0.40

D—Compound Composition

Cement No.	$CaSO_4$	C_4AF	C_3A	C_3S	C_2S	MgO	Free CaO	Loss
1	4.9	10.7	9.5	47.8	21.8	3.4	0.10	1.2
2	5.0	10.4	9.5	48.5	20.3	3.5	1.20	1.2
3	5.1	10.3	8.8	49.4	17.6	3.5	3.90	1.1
4	4.9	11.5	8.9	57.7	11.7	3.4	0.60	0.9
5	4.9	15.0	6.9	58.2	10.2	3.3	0.30	0.6
6	5.1	10.3	9.3	55.3	15.1	3.4	0.40	1.0

E—Compressive Strength

2 in. Cubes—Graded Sand

Mix: 1:2.76 W/C Ratio = 0.80

Cement No.	Age in Days 1	3	7	28
1	2726	4828	6350	8150
2	2745	4534	6625	7710
3			No Test—Unsound	
4	3368	5894	7125	8788
5	3133	4984	6542	7838
6	3267	5019	6825	8378

Hints and Helps for Superintendents



Safety Suggestion

By J. P. Camm
Watonga, Okla.

HERE is a suggestion for your "Hints and Helps for Superintendents" page. This may be of value in bringing the matter of accident prevention to the employes. It has been received with favorable comment at our plant. On each month's time cards we stamp a safety slogan which is short and to the point. Below you will see an example of our first one. You will note the letters are ¼ in. high. When a workman takes his card each morning, he cannot help but notice the slogan, and this serves to keep him safety conscious. A stamping outfit can be purchased for $2.50 or less, so that there is very little cost involved.

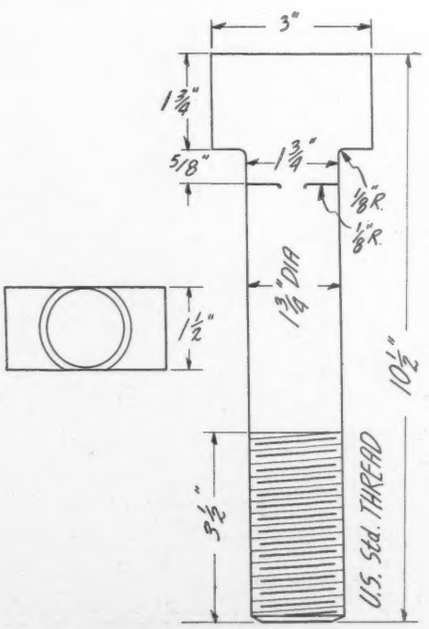
Play Safe Today
We Count on You

Clinker Cooler Bolt

By E. H. Fleischman
Keystone Portland Cement Co., Bath, Penn.

CLINKER COOLER BOLTS for holding lifting shelves to the inside of rotary clinker coolers must be strong at high temperatures. For this reason 18 and 8-in. chrome-nickel steel was used for the bolt shown. This material is expensive and hard-working, and the original bolts made of it forged to size, turned and threaded cost $13.00 each with plain steel nuts. This was reduced to $5.62, by turning the bolts from a solid bar 3 by 1¾ in. Using a bar 3 x 1½ in. as shown reduced the price still further to $4.90 without affecting the quality of the bolt. The diameter at the root of the thread is just 1½ in., the thickness of the bar. The threads were rough turned in a lathe and finished to size on a bolt cutter, the mill scale on the side of the bar at the thread only being first removed by grinding so the dies would not be injured.

In use, the bolt head is pushed through a slot in the lifter shelf and given a quarter turn, then brought back so the 1¾ in. rectangular part engages in the slot to prevent rotation. If a slot instead of a round hole is cut in the cooler shell, the bolt may be installed by a man outside the shell entirely, but a washer and asbestos gasket must be used.



Clinker cooler bolt

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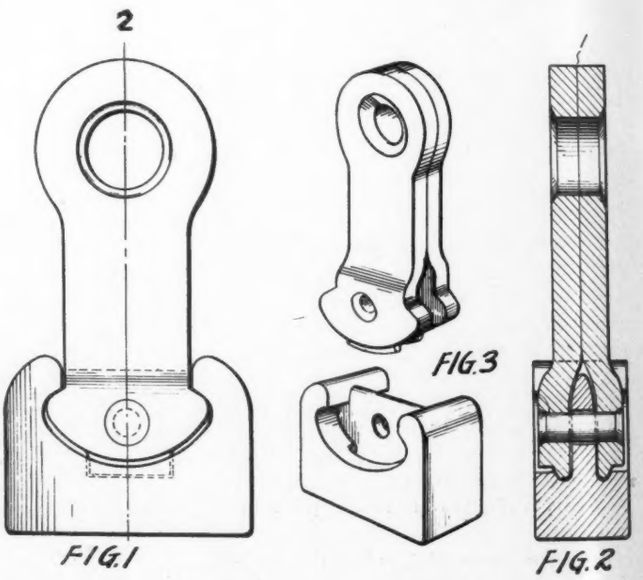
Removable Hammer Head for Hammer Mills

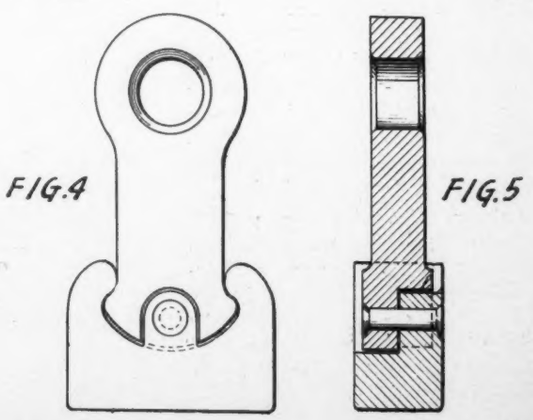
By H. A. Ambler
General Superintendent, Superior Portland Cement, Inc., Concrete, Wash.

I AM ENCLOSING a patent drawing of a detachable head for a Williams mill hammer. We have used these the past few years and have effected a 20% saving in hammer cost. The device is made for us by the Electric Steel Foundry Co., Portland, Ore. It was invented and patented by our James P. Brooks, and the patent assigned to our company.

Mr. Brooks has been employed in various capacities by our company since 1913, and in

Removable hammer - mill head which effected a 20% saving in hammer cost at Superior Portland Cement plant





the latter part of 1928 was made general foreman, which position he holds today.

During the past years, we have made several changes in the design of our Williams mill hammers, and in 1930, we tried a set of Briggs hammers. These hammers have a removable head, but are not reversible, i. e., have only one wearing edge.

Mr. Brooks then conceived the idea of a removable head that was also reversible. There had been other reversible head hammers on the market, but in these hammers the head and link were connected by a rivet or pin, which in service eventually became loose and was a source of trouble. In the Brooks hammer, the only function of the rivet is to hold the links from spreading, thus giving a much safer and trouble free assembly.

Bin Level Indicator

By John W. Kennedy
Engineer, Service Bureau, Huron Portland Cement Co., Detroit, Mich.

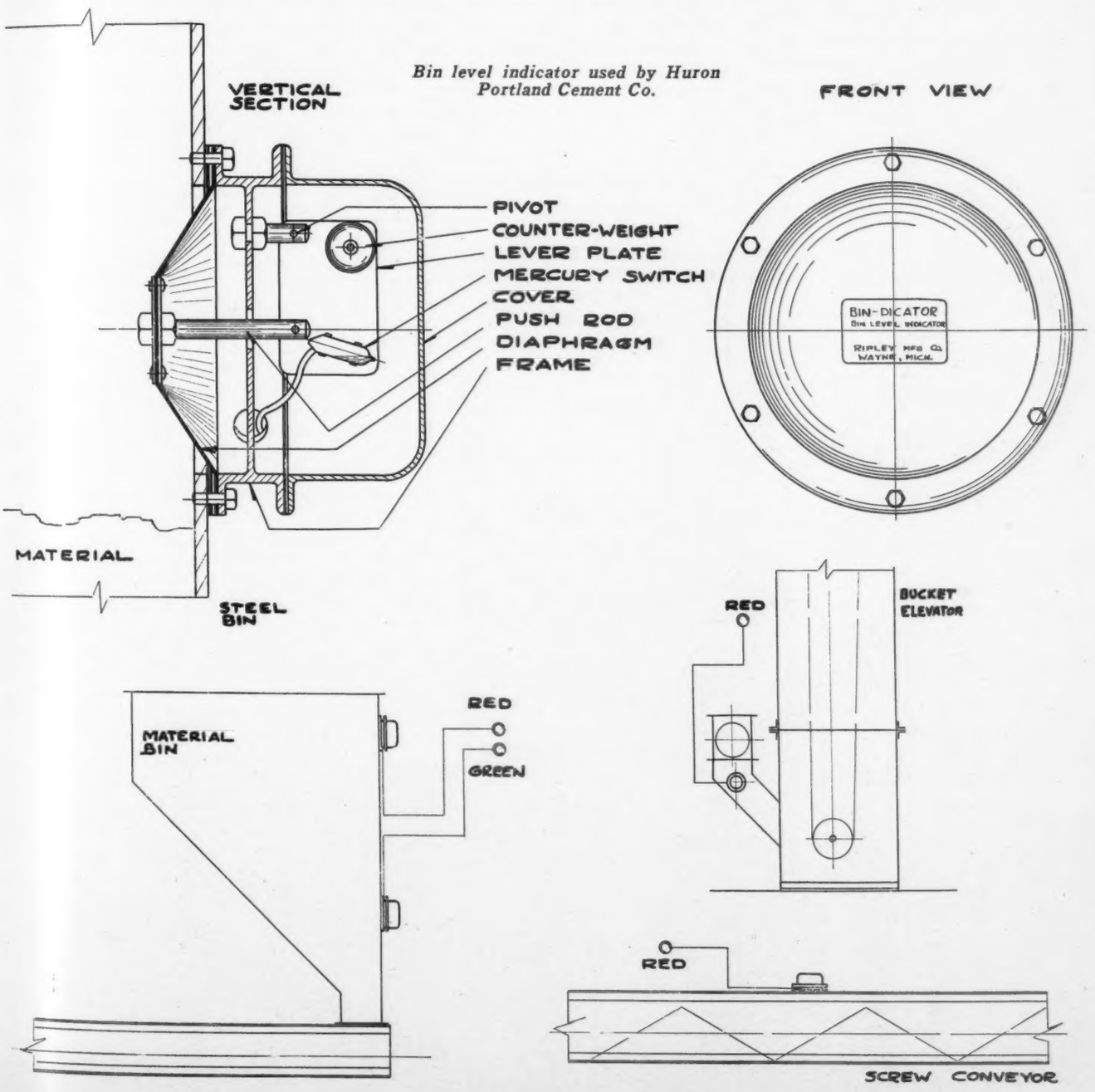
THE DEVICE described was developed by a friend of mine, and is now made on a commercial scale under the trade name "Bin-Dicator." It has been in use by our company for some time at the Oswego, N. Y., and Toledo, Ohio, storage and packing plants.

The operating mechanism consists of a dust-tight canvas diaphragm which actuates a counterweighted lever. This in turn operates a single-pole mercury switch. When the material in a bin, hopper, screw conveyor, or elevator boot, exerts a pressure at the point where the level-indicator is mounted, the diaphragm moves outward and operates the mercury switch, lighting a bulb at the control board, which is placed in a location where it may readily be seen, or throwing motor cut-out switch if desired. When the pressure is relieved, the counterweight forces the diaphragm to normal position, reversing the operation of the mercury switch.

The dust-tight canvas diaphragm is 8 in. in diameter. The counterweight on the lever which is actuated by the diaphragm is adjustable, to meet the requirements of different materials.

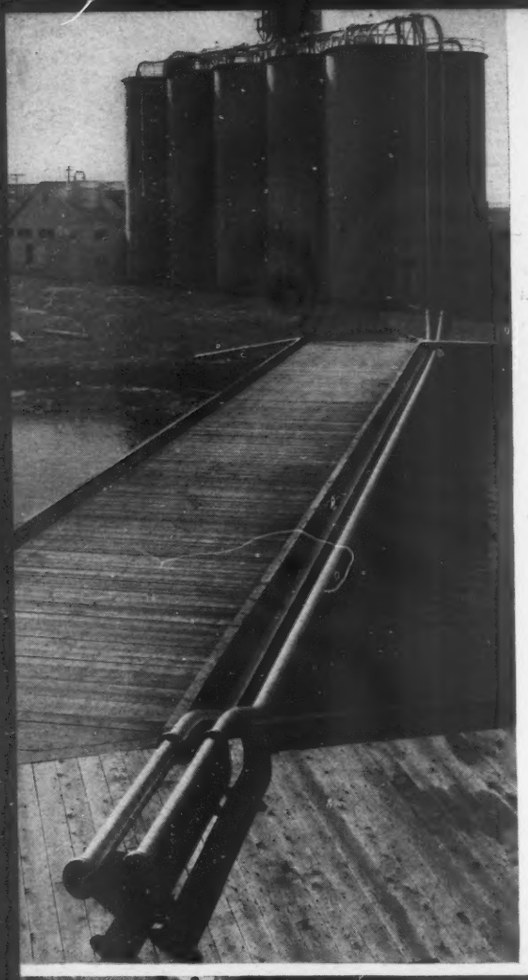
A cross-section detail of the device is shown in Fig. 1. From this it will be seen that there are no springs in the device, and there is nothing that requires lubrication.

Mounting of the installation is relatively simple, involving the cutting of a hole in the bin wall 8 in. in diameter, and the drilling of six bolt holes.



Bin level indicator used by Huron Portland Cement Co.

Santa Cruz Portland Cement Company Expands Operations



WHILE most other cement companies have awaited the return of better days to make improvements, or rehabilitate plants, the Santa Cruz Portland Cement Co., San Francisco, Calif., with plant at Davenport, Calif., has nearly doubled its investment in the industry, and has thus obtained a foothold in all the West Coast markets except Seattle. During the past year the company has put into commission the largest oceangoing, bulk cement carrier, and has built silos and packing plants in the Pacific Coast ports of Portland, Oakland, Stockton and Long Beach, extending over some 800 miles of coast line. Through these distributing plants the company can reach, by short rail, truck or water shipment, nearly every important population center south of Seattle and Tacoma.

Details of Oakland packing plant and distributing depot of the Santa Cruz Portland Cement Co.





This extension of the company's marketing territory, however unpopular with its competitors, is an excellent example of economic utilization of the principal advantage of water transportation, its low cost per ton mile. In many cases this advantage is offset by the slowness of water-bourn transport as compared with that carried on rails and the modern highway. But with a carrier of such large capacity as the "Santacruzcement," the new ship, and ample storages at the port stations, speed is not necessary, and capacity and storage seem to have been worked out to provide for no more than a reasonable margin and for future growth. This is only one of the features of the system that shows the sound engineering that governed its design.

The plant of the Santa Cruz company, at Davenport, has been producing around 10,000 bbl. daily, even in the days of depression. Davenport is a small town about a dozen miles from Santa Cruz, and perhaps 75 miles south of San Francisco. Here is one of the few deposits of good high calcium limestone found close to the California coast, a large deposit placed so that it can be quarried by the cheapest of methods. Shale is abundant near by, and oil for fuel is produced at several points along the coast. Nature has been kind in respect to these things, but she did not complete the gift by placing them where a harbor could be made. For the coast along by Davenport is all high bluffs; and deep water, into which a ship of the size of the "Santacruzcement" can come safely, lies nearly half a mile out. This has necessitated the construction of a pier extending to deep water, which carries the pipes through which the cement is pumped.

Incidentally, fuel oil for the kilns has been pumped ashore from tankers for several years, and it is said that it was this that suggested the idea for pumping cement from plant to ship. The oil lines were on the bottom, with a flexible end, attached to a buoy off shore, which the tanker picked up from anchorage. There probably was not enough experience in pumping cement to justify experimenting with a pipe line on the bottom. Leakage, or condensation of moisture in the pipe line, would have had too serious results.

The cement pipes start from new storage silos at the plant. There are four main silos and one inter-silo in a block, 118 ft. high over all. The inside clear storage space is 32 ft. diameter and 100 ft. high in the main silos, enough for approximately 21,000 bbl. each, or a total of 84,000 bbl. and one inter-silo of 6,000 bbl. capacity, making a total silo storage for boat loading of 90,000 bbl. of cement. These silos can be filled from either finish mill or from plant stock house

With Centrally Located Plant the Company Distributes Over Nearly the Entire Pacific Coast Line of the United States

By Edmund Shaw,
Contributing Editor, Rock Products

bins through Fuller-Kinyon pump lines approximately 500 ft. long, which gives it great flexibility. This pump installation is of the regular type used in connection with pack houses and for filling silos, 6-in. pumps with Fuller rotary compressors and Westinghouse motors.

The pumps below the silos, which pump the cement to the ship, are of a quite unusual type, however. They look like the others, but are very much larger, rated as 10-in. and pumping through 12-in. pipes. These portable pumps, movable on rails below the silo discharge spouts, are of the largest standard size of Fuller-Kinyon pumps, and embody in their design all of the latest improvements, including automatic oil lubrication, instead of grease. According to Mr. Morrow, the Fuller company's engineer, the power required is somewhat less than was expected.

Connection to the silos is made with the usual piping and 12-in. reinforced-rubber hose. Connections at the pier and partly to the ship are also made with this hose, so that about 180 ft. of it is in use all the time. The pipes from the two pumps are 12-in., but of thinner metal than standard, so that the actual diameter is a little over 12 in.

Adjoining the block of silos is the compressor house, a steel-frame building about 75 ft. square, which contains the compressors and motors. There being no rotary compressors made for this size pump, two compressors of the type much used in the mining operations of the West were purchased. They are of Ingersoll-Rand make and much alike, one of 4500 and the other 4700 c.f.m. capacity. The pressure at which they blow off is 75 lb., but the actual pressure carried when the cement is flowing is around 40 lb.

Both of the motors which drive these compressors are of General Electric make, form E, for 2200-v., 60-cycles current. One develops 804 hp. at 150 r.p.m., the other 932 hp. at 139 r.p.m. The water-cooling on both is guarded with Mercoid switches and an alarm whistle that blows whenever the water stops running.

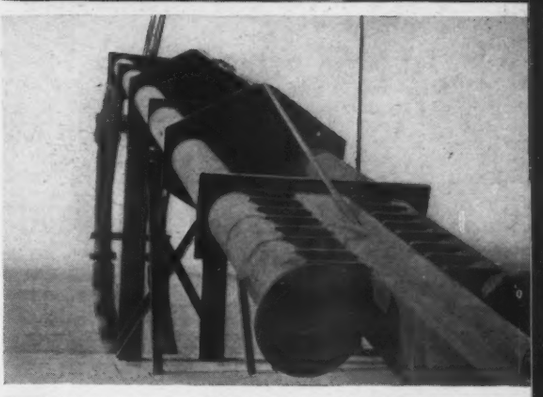
Loading Pier at Davenport

The pipes pass through a 6x7 ft. tunnel 360 ft. long to the loading pier. This is one of the most important features of the installation, not only from the standpoint of its utility, but as an engineering job. It was designed by R. A. Kinzie, consulting engineer, San Francisco, who designed most of the silos, pipe layouts and other structures at Davenport and at the distributing stations.

The Pacific Ocean is anything but pacific at times on this part of the coast. There is usually some wind at Davenport and often there is a good deal of it, and there are also heavy ground swells that come from far-out storms, unaccompanied with wind. It was necessary to design the 2327-ft. pier so that it would stand the worst of these conditions, and this was done by designing for the least exposed surface compatible with strength and durability. The construction is of steel with welded joints which make a stronger structure for the same weight, and, what is of more importance, no water can get into the joints. The design and construction of this pier was described in *Engineering News-Record,* of January 10, 1935.

The deck of the pier is 30 ft. above mean low water, and the lower chord is 10-ft. above. There are the two 12-in. cement pipes, one for each pump, a 6-in. oil pipe and a 3-in. water line running out to the ship. These are carried on long timbers and guided on the curves by rollers on the top, bottom and sides, so that expansion and contraction can not move the pipes sidewise. There is also a light railway for bringing cement in bags and other supplies than oil and water to the ship. The pipe stringers, the railway ties and a cat-walk are the only

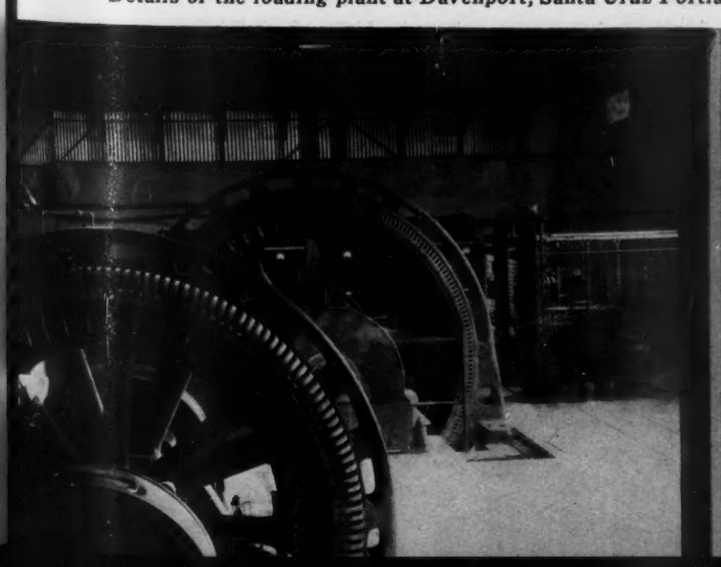




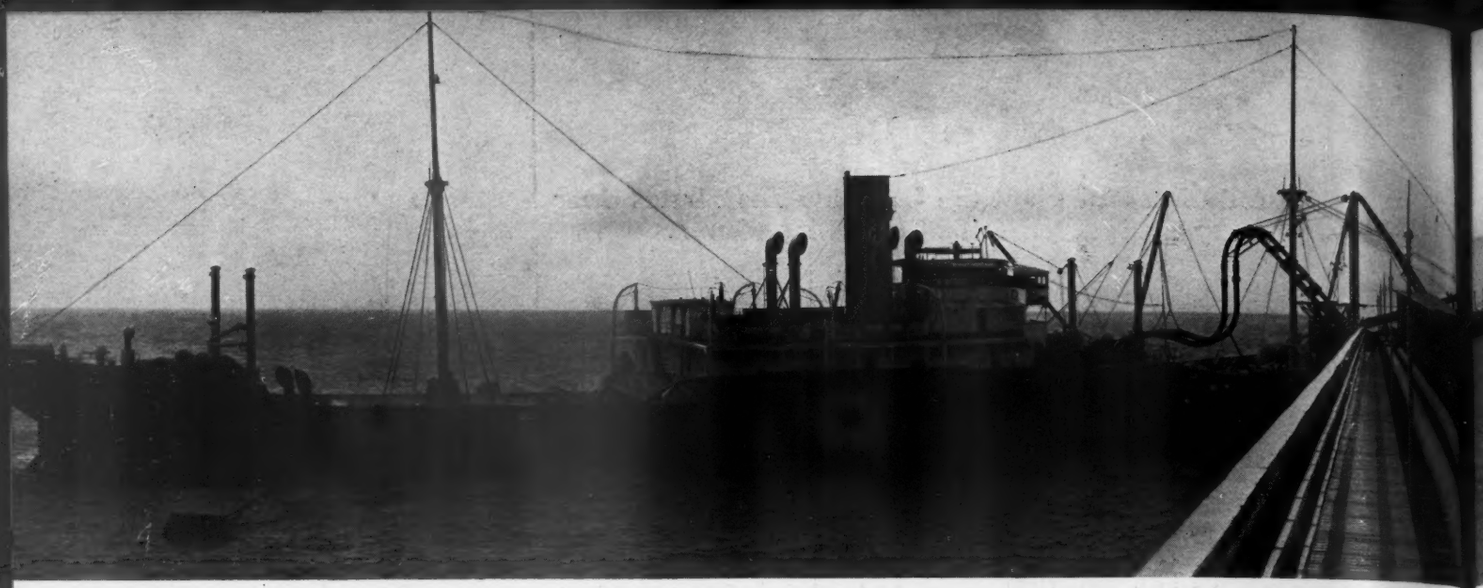




Details of the loading plant at Davenport, Santa Cruz Portland Cement Co.







wood parts on the pier. And these are set so that the waves can take them off, without damage to the pier itself.

The "Santacruzcement"

Very thorough descriptions of the ship "Santacruzcement" have been published in *The Log, Marine Engineering,* (both October, 1934), and other marine journals, so details other than those which relate to cement carrying will be largely omitted. The ship is 400 ft. long; the beam is 54 ft., 6 in.; the moulded depth is 30 ft., and the deadweight 8460 tons. The cargo capacity is 422,712 cu. ft. Its triple expansion engines develop 3000 Imperial hp. and the three boilers are of the Scotch single-ended type, carrying 200 lb. pressure.

The ship was built in Japan in 1920, of steel fabricated in the United States. The remodeling to make the ship a cement carrier cost $600,000, and this was done by the Sun Shipbuilding and Dry Dock Co., Chester, Penn., under plans and specifications by Theodore E. Ferris, a well-known New York naval architect.

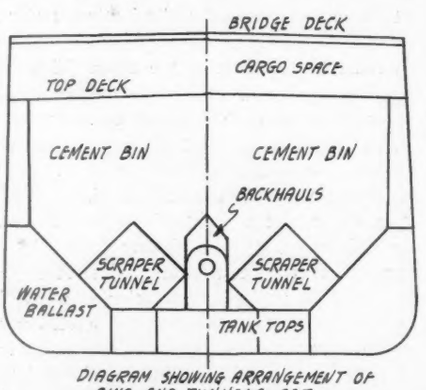
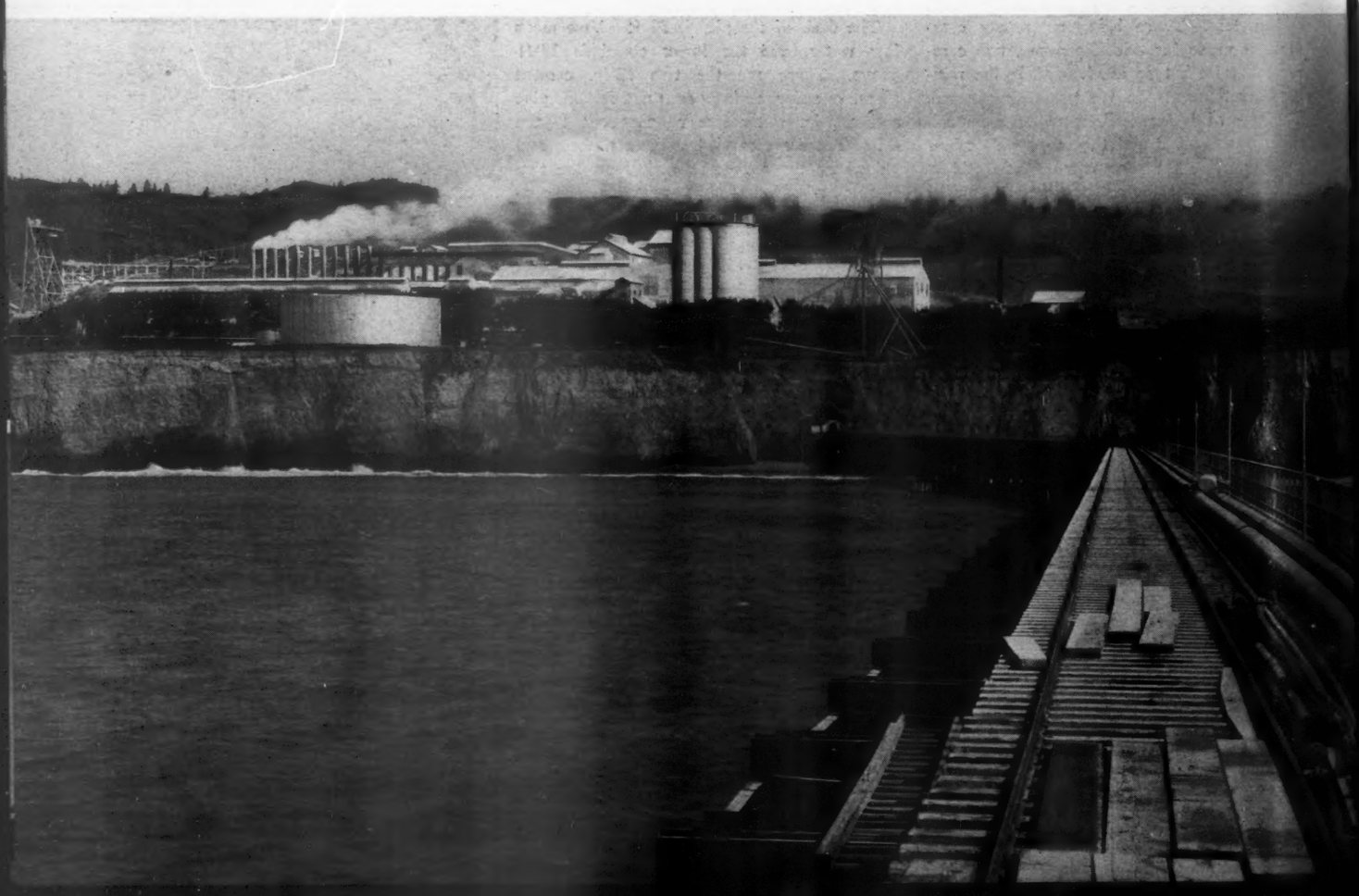


DIAGRAM SHOWING ARRANGEMENT OF BINS AND TUNNELS AFT.

Cross-section of the "Santacruzcement"

Practically everything but the frames between the top deck and the tank tops had to be changed or added to in some way. New bulkheads made a number of new packing, hauling, pumping and electric machinery spaces and the cement bins. These were placed between new longitudinal bulkheads, two parallel to the sides of the ship and about 33 in. away from them and a third on the center line. The spaces between the side bulkheads and the sides were utilized for water ballast tanks below, and for dry tank storage and to hold wiring and piping above.

The bottom of the bins is double hoppered all the way along, almost a W-section, and the scraper tunnels, where the cement is dragged out, are between the hoppers. There are four scraper tunnels, two forward and two aft, with a space for machinery in the center. One of the two Fuller-Kinyon pumps is in this space, the other being aft.





All these tunnels are of the same triangular section, 8 ft. wide on the bottom, and 8 ft., 10 in. high to the apex. The sides slope at 45 deg. Near the bottom of each side is a long slot broken only by the supporting frames, through which the cement flows into the tunnel. In No. 1 and No. 2 bins, steel doors with felt gaskets may be placed over these openings so that a different kind of cement may be carried in these bins and discharged separately.

The bottoms of the scraper tunnels are made of steel plates welded together at the edges and also to the tank tops. These plates make a smooth runway for the scrapers.

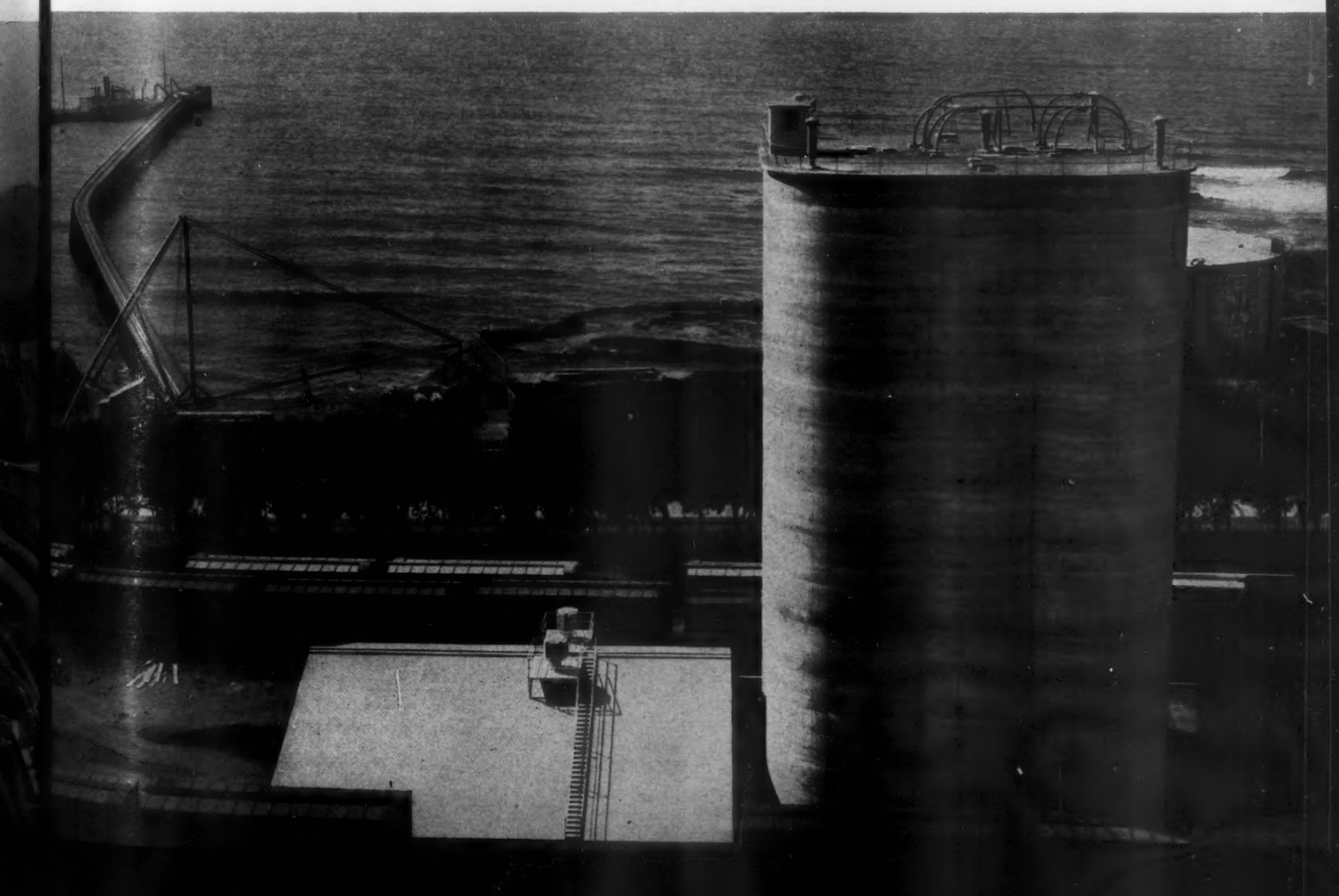
The forward tunnels rise to a ramp near the center of the ship, up which the scraper buckets in the forward tunnels are drawn so that they will discharge into the hopper above the center Fuller-Kinyon pump. A similar ramp at the stern carries the after tunnels to the other Fuller-Kinyon pump. Both hoppers have screens of flat bars, spaced 1-in. apart, to prevent loose tools or other large pieces of foreign matter from getting into the pumps.

The system of tunnels and scrapers is that patented by Leathem D. Smith, and the scraper equipment was built by the Leathem D. Smith Dock Co., Sturgeon Bay, Wis. The four hoists, or winches, as they are called on shipboard, which pull the scraper buckets, are Sauerman double-drum, electric hoists, each connected by silent chain and sprocket drive to a 100-hp., 720-r.p.m., synchronous Westinghouse motor.

The control levers for the scrapers are in special rooms from which the operators can see the scrapers at work. The arrangement is like that in use with scraper buckets at gravel plants, except that few gravel plants have the clutches operated by compressed air, as they are on this ship. The air valves are manually operated.

The cables which pull the scraper back, after it has discharged its load of cement, run in a small tunnel between the scraper tunnels and between the after tunnels this is over the propeller shaft tunnel. A sketch of a section with this should make the arrangement of bins, hoppers and tunnels clear.

The Fuller-Kinyon 10-in. pumps are driven by 350-hp. synchronous, Westinghouse motors, with field rheostats and semi-reduced voltage starting panels. These, and all the other motors on the ship, run on 2300-v., 3-phase, 60-cycle current. The four compressors for the pumps are of Chicago Pneumatic make, two-stage, 23 by 13 by 16 in. They run at 160 r.p.m., delivering 1500 c.f.m. Each compressor is connected to a 300-hp. Westinghouse synchronous motor of the



same type as those on the pumps. There are two air receivers, 5 ft. diameter and 14 ft. high.

The cement bins are filled through a system of pipes that lie mainly on the top deck and are so solidly fastened to it that they cannot be moved by the motion of the ship or even the force of the waves that may sweep over the deck during a storm. Connection between these pipes and the pipes on the dock at Davenport is made by pipes and rubber-reinforced hose. The connecting link is handled at present by a stiff-leg derrick with an 43-ft. boom. This was bought locally and installed as a more or less temporary measure, for the design calls for a balanced derrick that can be more easily handled. Between this connection and the long pipes on the pier there are lengths of reinforced-rubber hose, carried on dolleys to allow movement.

Sly dust collectors were being installed on the ship when the notes for this article were made. In addition to bulk cement, the ship carries about 5000 sacks of cement.

Oakland Station

There are stations with pack houses and storage and bulk shipping facilities at Oakland, Stockton, and Long Beach, Calif., and at Portland, Ore., as already noted. All the stations are much alike in design. Between the Oakland and the Stockton station, the difference that was noted was in the type of switchboard, which was wholly of the fuseless type at Oakland. At Oakland, too, the air receivers were outside the compressor room, but such changes are unimportant.

For the reasons given, only the Oakland station, which was studied more than the station at Stockton, will be described. It stands just at the end of the "tube" that connects Oakland and Alameda, near the works of the Bethlehem Steel Corp. This is on a basin, which ships of considerable draft may enter, and there is a new wharf at which the cement carrier may lie while she is discharging.

The cement is pumped ashore through two 10-in. pipes, 309 ft. long (to the bottom of the silos). There are ten silos, all having clear storage spaces of 24 ft. diameter and 50 ft. high. All have the usual arrangements used with filling by Fuller-Kinyon pumps, for showing when a bin is full, and other details. Vents on the silos have been equipped with Sly dust collectors.

There are two 8-in. portable Fuller-Kinyon pumps on parallel tracks for withdrawing the cement from the silos, and an 8-in. stationary pump in the packhouse. The portable pumps are driven by 100-hp. motors and the stationary pump by a 150-hp. motor, all of Westinghouse make.

Air for pumping is supplied by two Fuller rotary compressors, giving 50 lb. maximum pressure. They are direct-connected to Westinghouse induction motors, type C.S., working at 440-v., 60-cycles. Each compressor has an actual free air delivery of 1200 c.f.m.

The pumps below the silos pump to bins above the Bates valve-bag packers, to a Fuller automatic continuous weighing batcher, equipped with a Toledo "Printweigh" scale, and through a by-pass to the hopper of the 8-in. pump. Packed cement is discharged to a reversing belt conveyor. Run in one direction the bags are delivered to trucks and in the other to load railway cars.

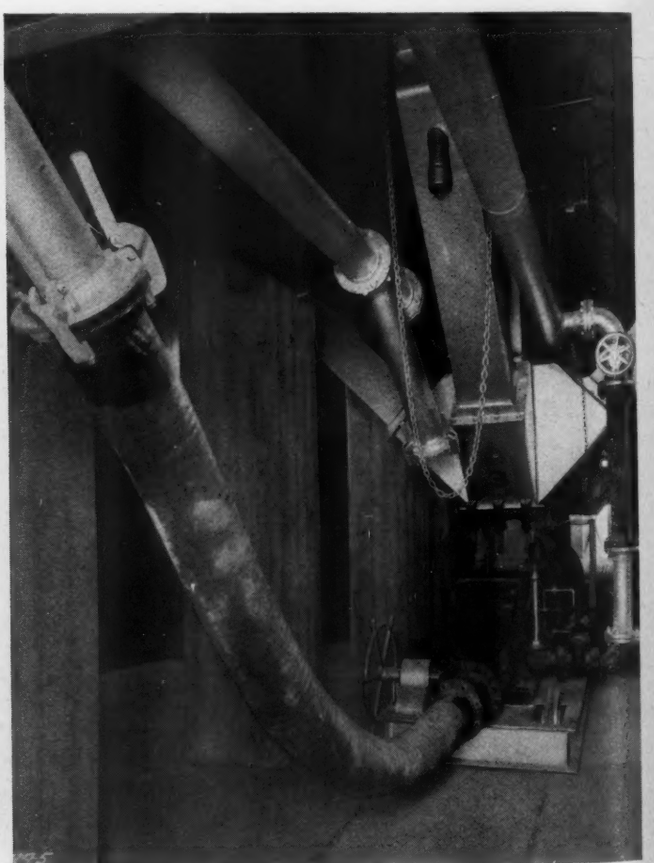
The 8-in. pump may be used to load cars, trucks, barges or ships, to blend cement by pumping it in and out of the same silo, or to transfer it from one silo to another. It may happen that a customer wishes to purchase cement for a good sized job, taking it away as the work requires. In such a case a silo will be reserved for him and will be filled by the 8-in. pump, but all the cement going to the pump will first be weighed.

The Stockton station is at Stockton Port, which is about three miles from the center of the city. Quite recently this port has been developed by the addition of new docks and warehouses. The silos and pack houses of this station are considerably farther from the wharf than they are at Oakland.

The offices of the Santa Cruz Portland Cement Co. are in the Crocker Building, San Francisco. George T. Cameron is president; George R. Gay, general manager; R. A. Kinzie, chief engineer; Joseph Riordan, works superintendent.



New type cement pumps below a silo withdrawal spout, Oakland plant



Automatic weighing equipment for bulk shipments—Oakland distributing plant

Rock Products News Briefs

Housing Outlook

Chicago, Ill.: Frank O. Schneider, president, Northern Central Building and Loan Conference, in a discussion of the real estate situation, said recently: "There has not been and will not be an uninterrupted improvement. Many sources of discouragement are still prevalent, but there is major improvement, nevertheless. Every day more associations are reporting on a normal basis so far as withdrawals are concerned. New money is coming in in a volume greater than at any time during the past four years."

Other speakers included A. D. Theobold, director of education and research, American Savings, Building and Loan Institute, who saw "one of the greatest threats on the building and loan horizon" in the "cloud of moratoria which have been proposed both nationally and in the states. Therefore, it behooves us to keep our eyes open for such devastating moves." Pointing out that only 3% of the mortgages held by associations in 1933 were foreclosed, he remarked on the small advantage to be obtained from such legislation. "The house that cost $10,000 in 1928 would now cost $9500 to build," he said. "It could not be sold for more than $6500. Decreasing costs of construction and higher realty values could narrow this margin which is retarding new building. Rents have increased recently and I see no reason why they shouldn't continue to increase."

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New York City: Standard Statistics Co., in a Bulletin dated March 13 on "Building, Real Estate and Related Lines," says: "The Federal Housing Administration has now insured only about $40,000,000 of loans for repairs and modernization, although, if cash transactions and projects financed through normal channels are included, a much larger aggregate of work is reported to have been undertaken as a result of repair and modernization drives. Activities may be extended substantially if favorable action is taken on the proposal to raise the limit of repair loans from $2000 to $50,000. The scope of loans would thereby be widened to include work on large buildings of all types. Promotion of new home construction, on the other hand, has accomplished practically nothing and offers little promise, at least over the near future. Many applications for loans are reported to have been received, but mortgages such as those contemplated under the Housing Act are ineligible as investments for banks, insurance companies, etc., under the laws of numerous states. Moreover, lenders are unwilling to tie up funds in mortgages for which there is no established market, and are further deterred, in certain states, by mortgage moratoria. Limited profit possibilities and the $5,000,000 capital requirement are preventing the mobilization of private capital in the National Mortgage Associations which were planned as rediscounting agencies for the new type mortgages. The Housing Act amendment (now pending in Congress), which reduces the capital minimum to $2,000,000 and authorizes the RFC to subscribe to such stock, will be of some assistance but will fail to provide any additional inducement to private investors.

"Legislation to render FHA insured mortgages eligible and attractive for local institutions has been requested of 44 states by the Federal Government. Governors of 38 states have signified approval of the suggestions but only two states have enacted the necessary laws. With legislatures now adjourning, the required changes probably will not become generally effective for at least a year. Home building as a result of the FHA program will therefore be of negligible importance in early future months, but may expand moderately later in the year. Eliminating this factor, however, residential construction for this year, including alterations, should improve substantially over the severely depressed total for 1934. Growing demand, improving capital conditions and expected further progress toward business recovery all point in this direction."

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Chicago, Ill.: Sewell L. Avery, president, United States Gypsum Co., is reported to have told his stockholders at their recent annual meeting that before a building increase of large magnitude gets under way prices and wages likely will be lowered. Such a move would make homes available to a larger portion of the population. Along this line he expressed an opinion that there will be a period of deflation preceding inflation. The possibility of this has the business world and business executives "not only puzzled but actually worried," he said. Continuing, he stated that there is no immediate improvement in sight, although he emphasized that he is not pessimistic. He need not be, for he said later on that the dollar volume of the company's business for the first two months of 1935 was 35% larger than for the same period a year ago.

Mr. Avery expressed his disbelief in policies developed under NRA and cited that the code set-up seems to be cracking. He stated that under code schedules prices were too high since they were established to protect the small producer who does not operate with the same efficiency as other units in industry. It is short sighted to believe that in order to be prosperous the country must enter upon a great building program, he said, and pointed out that we did too much building during the past period of prosperity. To think that building is the cure to present conditions is to be unsound, he said. Home construction and industrial construction come when other lines of business are active and there is demand for additional quarters.

C. F. Henning, vice-president in charge of sales, stated that this year there are no large projects carried over from last as was the case at the start of 1934. For this reason sales of plaster for the first six months of 1935 probably will be less than in the corresponding 1934 period. The sales executive expressed disappointment with results of the Federal Housing Administration program to date.

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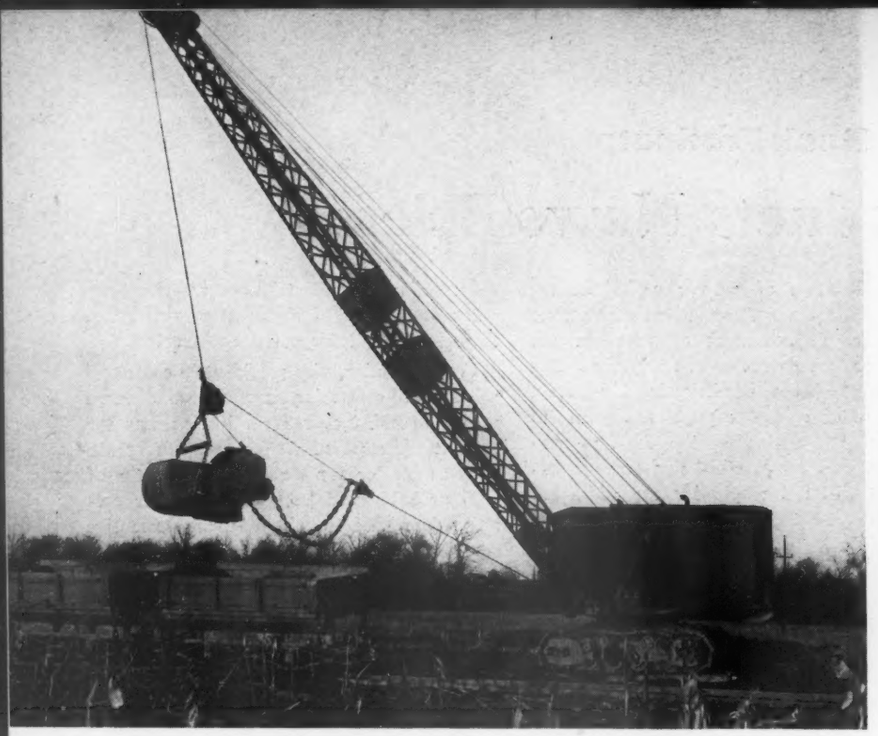
Washington, D. C.: As a propaganda bureau the Federal Housing Administration tops all others for volume of material produced. Its mission in life, as officially announced recently, is:

"(1) TO MAKE KNOWN, and impress upon owners of homes and other properties, the fact that credit to finance repairs and modernization, which may be repaid in installments out of income, has become a tangible reality—something available at a local financing institution and not something indefinite and distant.

"(2) TO ENCOURAGE all property holders throughout the country to make careful inspection of their buildings and grounds in order to determine what repairs and upkeep are required to keep them from rapid deterioration, and what improvements they would like to make and could reasonably afford. The reservoir of work to be tapped in this way is of immense volume, potentially running into many billions of dollars, only a fraction of which will require financing through the Modernization Credit Plan.

"(3) TO BRING ABOUT an accompanying re-birth of sales and production activity in the building and building materials industries, with resulting increase in employment, decrease in the burden of the public relief roll, and general toning up and increase in business and employment."

Housing repair, renovation, modernization and construction needs of the United States have been varyingly estimated as being from $1,000,000,000 to $4,500,000,000 annually. Choosing the former figure as a basis for estimate, the Federal Housing Administration has worked out a market analysis showing the distribution of these needs and the per capita expenditure that would have to be made to provide for such an annual demand for new homes and the proper maintenance of existing dwellings in a state of good repair. This analysis is available to any manufacturer, dealer, contractor or individual on communicating with the Federal Housing Administration at Washington, D. C.



Dragline for stripping overburden and loading gravel

Recent Sand, Gravel Of 125 Tons Per

Uses Conical Thorough Washing

ONE of the modern sand plants in the state of Tennessee is that of the Estill Springs Sand and Gravel Co., of Nashville. It is located about 85 miles southeast of Nashville at the little town of Estill Springs. Here in 1927 the company built its first plant. The one described here is its second.

The pit is large in area, but there is an average bank of only about 12 ft., covered with about 1½ ft. of overburden. The company owns a considerable amount of property near the plant, and it is all good sand and gravel land, so there is no danger of running short for years. In fact, it is estimated at millions of tons of sand and gravel, an amount sufficient to supply the plant for many years. The sand in the bank is sharp, largely composed of silica, insuring good strength tests when used in concrete work. The gravel analyzes practically 97% silica, and has a natural irregular slope. In addition to its use as concrete aggregate, considerable of the gravel is used by industrial plants for its silica content.

The stripping is done with a Byers "Master" drag-line, the waste material being thrown over the bank into the pit. The same drag-line, fitted with a 1¼-cu. yd. bucket, is used for loading the sand and gravel to the Kentucky Wagon Co., 4-yd., side-dump cars; each car carrying 5 tons or more, operated in trains of eight cars each. Two strings of cars are kept in use, with others in reserve. One string is in the pit being loaded and is switched to the pit yard limit by a 14-ton Porter steam dinkey, from which point the train is hauled to the plant by an 18-ton Porter steam dinkey. The company's narrow gauge railway crosses Elk River a considerable distance from the plant, the bridge being approximately 135 ft. in length, sturdily constructed.

Uniform Feed First Requisite

The cars dump to a concrete track hopper at the plant. A bar grizzly over the hopper keeps the larger stones out of the plant, permitting them to be sledged on the grizzly. A pair of 30-in. Link-Belt apron feeders, driven by G.-E. motors, beneath the hopper, deliver the material to a Link-Belt conveyor to be taken up to the scalping screen. The 24-in. conveyor is driven at its head end by 15-hp. G.-E. motor through a Link-Belt enclosed chain drive. It operates on 84-ft. centers to reach the screen.

Scalping is done by a Link-Belt revolving screen 12 ft. long and 48 in. in diameter. It is placed directly over a Telsmith primary breaker, so the rejects drop into the crusher. The throughs of the screen are chuted to a 24-in. belt conveyor to be taken to the top of the plant and the discharge of the crusher also falls to the same conveyor. The crusher is operated by a 25-hp. Westinghouse motor.

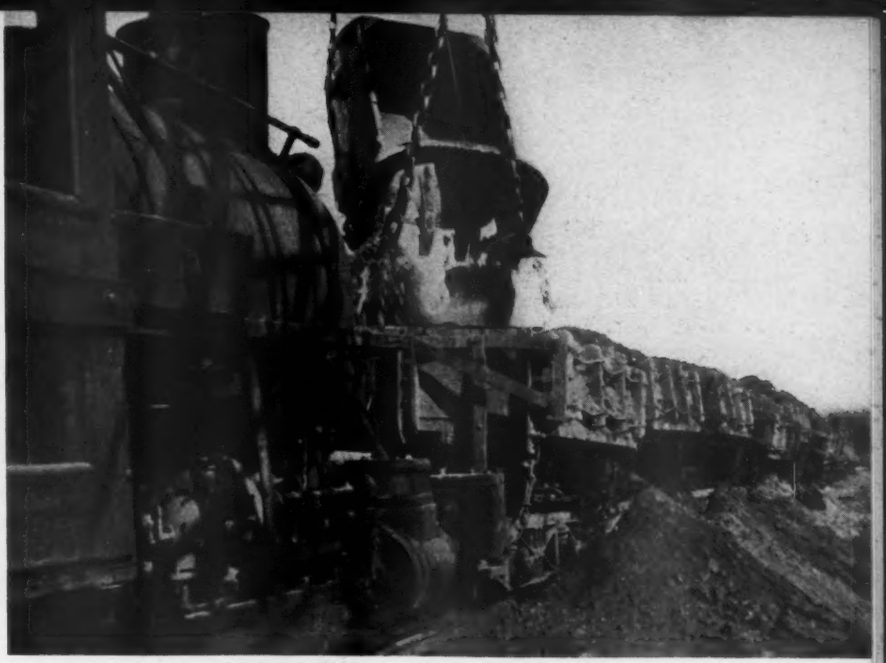
The conveyor to the top of the plant is on 233-ft. centers. It is driven at its head end by 15-hp. G.-E. motor through a Link-Belt enclosed chain drive. The belt operates over idlers equipped with Timken roller bearings to reduce friction to a minimum. At the top of the plant, the sand and gravel are delivered to a 60x97 in. Link-Belt cylindrical scrubber, and after being thoroughly washed, they are passed on to three conical screens.

Panorama of the plant of the Estill Springs Sand and Gravel Co. near Nashville, Tenn.



Plant in Tennessee Hour Capacity

Screens for and for All Sizing



Type of transportation equipment now used

which are 62x72x96-in. in size. The scrubber and the three screens are all in line, operating on the same shaft. The screens are the Dull type, manufactured by Link-Belt.

The first screen of the series has round 1¼-in. holes; the second has ⅝-in. or ¾-in. holes, as desired; while the last has ¼-in. holes. Except for the classifying of sand, these three screens do all the sizing of the material. The shaft on which they operate is turned by a 15-hp. Westinghouse motor. One of the improvements made last year was the installation of a 4x8-ft. scalping screen with 2¼-in. round holes to take discharge of the 1¼-in. screen and pass its oversize to a Symons disc crusher above the bins.

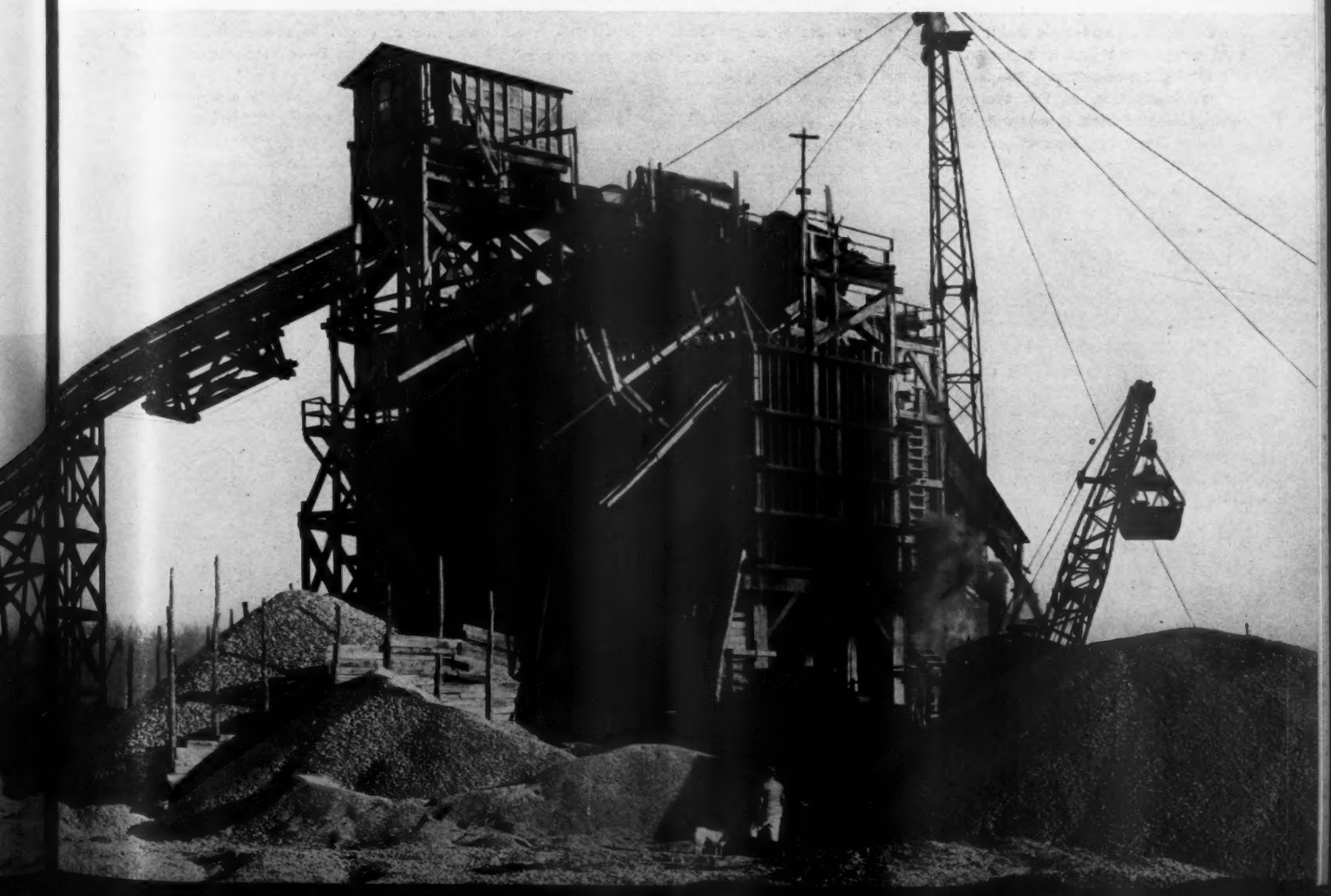
Final Washing in Chutes

The sized gravel from the three screens and from the secondary crusher just described is chuted directly to the bins below. Some of the chutes have screen sections in the bottom, and the material passes under a water spray over these sections so that any possible remaining fines are removed quickly before reaching the bins. Also, the loading chutes have double bottoms for a final rinsing by other sprays when loaded into cars.

Sand Recovery

The sand from the last screen is carried to a "Perfect" classifier, where the largest size sand is removed. Following this is a second classifier (smaller, but of same type), which removes the medium-sized sand and passes the remainder to a large sand drag. The two classifiers are of the screw washer type.

A reconstructed cableway excavator operation



The sand drag was constructed at the plant and is designed to separate out, wash and dewater the finest of the sand. Three sand sizes instead of two, as was the case before, are now made, in line with the most recent requirements for the best concrete sand. The material from the two classifiers and the sand drag can be blended in the chutes above the bins, so that sand with any specified fineness modulus can be obtained in the bins. The water when discharged from the drags still carries a fine sand for which the company has a ready sale, so the water is run into a sump dug into the ground and as it settles there, is recovered by the locomotive crane at odd times during the day.

Bins

There are three gravel and two sand bins located directly beneath the series of sizing screens. Each bin has a capacity of 150 cu. yd. of material.

The first plant (built in 1927) was a cableway excavator operation. As the area of the pit became wider, it was evident that some other type of operation would be more satisfactory and so the present methods were installed. With the present system, 125 tons of washed and graded material will normally pass through the plant in an hour.

Loading Facilities

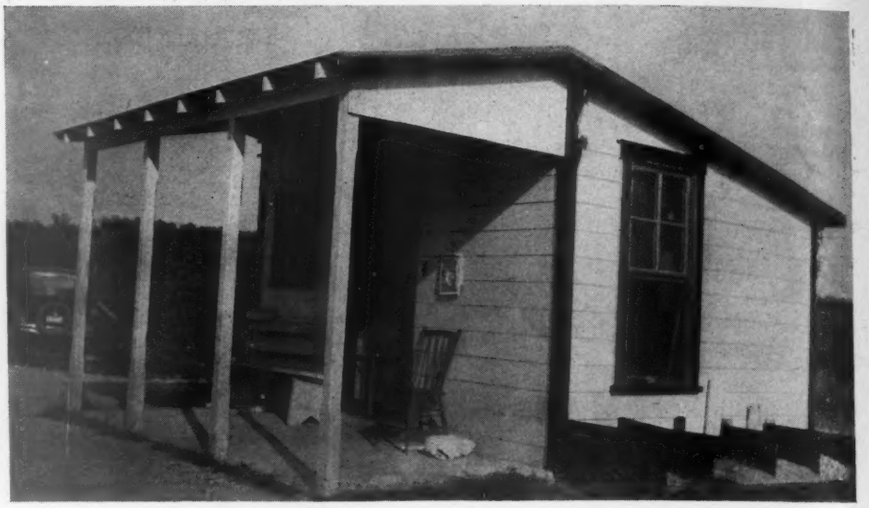
Beneath the bins are railway loading racks, with a large layout of yard tracks for empty and loaded cars; and from the plant to the main line of the Nashville, Chattanooga and St. Louis Railroad, the company has built its own connection a mile and a quarter in length. This connection is maintained by the sand company. When it is necessary to do any stockpiling of material, this is done along the rail connection, so that the material is readily handled both in and out of storage. A 25-ton Browning locomotive crane with a 1¼-cu. yd. clam-shell bucket is used for stockpiling and reclaiming. It is also used for moving cars around the plant and to the stockpiles. For spotting cars beneath the gates of the bins, a Street Brothers hoist is used.

Ample Water for Classifying and Washing

The Estill Springs company has available and makes liberal use of a relatively large amount of water to insure a well graded and very clean product. The water is pumped directly to the top of the plant from Elk River, which runs past the plant, the water coming to the plant in a 10-in. pipe line 1100 ft. long. An Allis-Chalmers 8-in. centrifugal pump furnishes 1800 gal. per min., and a large proportion of this is used in the scrubber and the sizing screens. A set of sprays at the discharge end of each screen furnishes additional washing and rinsing of the product as it passes from screen to screen. The pump is driven by a 100-hp. Allis-Chalmers motor.

Dried Sand

The company also ships a considerable amount of thoroughly dried sand for use in chemical manufacturing plants. In order to dry this sand, a small plant has been set up beside the washing plant, in which has been installed a Cummer road type rotary drying unit, coal fired but motor driven.



Office of the Estill Springs Sand and Gravel Co.

Personnel

Service and quality have been the watchwords of this company. The Estill Springs company meets any desired specification as to gradation, as required, by changing the screen surfaces on the three conical screens. Normally, the plant operates to produce at least four sizes of sand and six kinds of gravel, but all these sizes can be blended to produce other grades if it is desired.

The general offices of the company are in the Cotton States Building in Nashville, but the market is not limited to the Nashville district; the company's products go well over all the central portion of Tennessee, from Chattanooga to Nashville. Practically all of this material is shipped by rail. The sand and gravel is shipped as far away as North Alabama, Central Georgia, East and West Tennessee, although the greater portion of the production is used in Middle Tennessee. The company has enjoyed a good, steady production since the first plant was built in 1927, operating each month since then.

The president of the Estill Springs company is W. L. Hailey of Nashville; W. H. Parrish, Jr., is secretary and treasurer, in charge of operations; the general offices being maintained on the first floor of the Cotton States Building, Nashville, Tenn.; office of M. L. Forte, superintendent, is at the plant.

Sand and Gravel

G. E. Payne and associates, Redlands, Calif., are installing a sand and gravel plant at a point southeast of Cabazon, Calif. They will furnish sand and gravel for the Shea Construction Co., builders of the San Jacinto siphon on the Colorado River aqueduct.

Salem Sand and Gravel Co., Salem, Ore., has bought 18 acres on Painter's Woods road and will erect a modern plant to cost approximately $20,000. For the last five years the company has been operating on Front street, and prior to that it was at the foot of Court street. Partners in the company are Fred Anunsen, Paul B. Wallace and Joseph H. Albert. The deal was announced by Mr. Anunsen as company manager. Construction proposed by the company is two bunker units, truck garages, machine shops, office and a well for water supply. About half the equipment to be installed will be new and the rest will be moved from the old plant. Tests that have been made indicate that there is enough gravel in the acreage to supply the company's needs for 20 years. It is of better quality than is obtained from the river, Mr. Anunsen said.

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Blue Rapids Sand Co., Blue Rapids, Kan., has purchased some old street cars and will convert them into gasoline filling stations on Marshall County highways—a new sand and gravel side line!

◈ ◈ ◈

Cincinnati, Ohio: Emil J. Kietzman, vice-president of the Fairmount Fuel and Supply Co., building supply dealer, was fined $300 and costs by Judge Clarence E. Spraul in police court recently on the charge of having sold a load of gravel to the city of Cincinnati which was less than the amount specified in the order. It was alleged that the company made the delivery January 15. It was said to have been 14,600 lb., but in reality amounted to but 11,460 lb., a shortage of 3140 lb., the prosecution for the city charged. He was granted a 30-day stay to appeal.

◈ ◈ ◈

Tioga Washed Sand and Gravel Co., Wellsboro, N. Y., has been purchased by Jay Close of Wellsboro and Mr. and Mrs. Thomas Harris of Bradford. Messrs. Close and Harris will operate the plant.

Rock Products News Briefs

Sand and Gravel

Golden Sand and Gravel Supply Co., Red Bay, Ala., is building a new dredging plant to have a capacity of 100 tons per hour. C. D. Carter is general manager.

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Southwest Gravel Co., Springfield, Mo., is building a new sand and gravel plant on Krooked Kreek at Pyatt, Ark.

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San Diego, Calif.: Sand and gravel dealers petitioned the council to adopt an ordinance providing for regulations that would place the industry under authority of the state department of weights and measures. A proposed ordinance would make it unlawful to offer for sale or to transport rock, gravel or sand unless the person or firm so engaged is authorized by a certificate from the public weighmaster or sealer of weights and measures. A penalty for the first offense is placed at a $5 fine or five days in jail. For additional offense a $50 fine or 10 days in jail is provided. The proposed ordinance is similar to one passed in Los Angeles and in Sacramento, the council was informed. Asking passage of the ordinance are the Canyon Rock Co., the Daley Corp., H. G. Fenton Material Co., and Nelson & Sloan.

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Donner-Goetz, Inc., Buffalo, N. Y., has acquired the Carroll Bros., Inc., sand and gravel plant of 350 acres near Clarence, and will make extensive improvements and additions to it, according to announcement made recently. Carroll Bros. have been in the sand and gravel business near Clarence for 50 years. Officers of the new corporation are: Robert Donner, president; Samuel R. Goetz, vice-president; Ethel M. Graber, treasurer; Suzanne A. Gray, assistant treasurer, and Frank G. Raichle, secretary. In connection with the sand and gravel business, it is the intention of the new owners to erect a plant to make concrete sewer pipe, curbing and street lighting poles. Plans are also under way for erection of a black-top plant for making material for resurfacing old and new roads. Instructions have been issued to the plant superintendent to arrange to have the maintenance gang work to capacity in reconditioning the present machinery to take care of increased output. This will require the hiring of some new men in addition to the old employes now at the plant. The property has the necessary locomotives and dump cars operating on several miles of standard gage railroad track. It also has dragline and washing and screening plant. The capacity at present is 50 cars of sand and gravel daily.

Crushed Stone

Dunavant Quarries, Inc., Charlotte, N. C., has purchased the plant of the defunct Carolina Crushed Stone Co. in Charlotte and will be equipped with new machinery, according to S. J. Dunavant, president and treasurer. He said that this will be the only privately owned quarry within a radius of 40 to 50 miles of Charlotte and that he plans to serve contractors by furnishing their needs for highway work and to supply stone in forms desired by various types of customers. There will be a pre-mixed concrete plant. Plans of Mr. Dunavant call for installing the new machinery at once and expanding the business gradually until full time operation with a full force of men is started. Several years ago when the plant of the Carolina Crushed Stone Co. was operating at full time 75 men were employed. With prospects good for increased construction work in the coming months, Mr. Dunavant is optimistic over opportunity for increases in demands for the products which his company will offer.

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Fisher Quarry, on the Columbia River above Vancouver, Wash., will be kept busy throughout 1935 by the award of a contract for 700,000 tons of rock for use on Columbia River jetties to Winston Bros. Co. and Guy F. Atkinson Co., Portland, Ore. The bid was $1,493,535.

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General Crushed Stone Co., Easton, Penn., has leased the plant of the Mohawk Limestone Co., near Jordanville, N. Y. D. Wheeler Finch will continue as superintendent.

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General Crushed Stone Co., Easton, Penn., has applied for a permit to build a bituminous concrete mixing plant at Worcester, Mass., on land owned by the Boston and Maine R. R. Stone would be shipped from the company's plant at Winchester, near Boston. The application states the plant will consist of a steel structure with overhead storage bins, a two-ton mixer in which the stone will be coated with asphalt, a combination dryer and cooler in which the mixture will be dumped, a 75-hp., oil-fired boiler to provide steam to heat the asphalt before it is applied to the stone. The tanks sought in the permit include one of 10,000 gal. in which fuel oil is to be stored, one of similar capacity for the storage of "liquefied" and one of 15,000 gal. for the storage of "penetration" asphalt. The application said it was possible a fourth tank might be included for the storage of the asphalt. In connection with the plant a small truck and a 6-ton truck crane will be operated, and for these a 500-gal. underground tank for the storage of gasoline will be required, the application stated.

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Slag

Standard Slag Co., Youngstown, Ohio, is dismantling its plant at Bellaire, Ohio, the slag deposit having been exhausted. It was in operation about 10 years.

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Silica

Minnesota Mining and Manufacturing Co., St. Paul, Minn., producer of silica abrasives for various purposes and manufacturer of colored quartz roofing granules by a patented process (see ROCK PRODUCTS, October, 1934) at Wausau, Wis., has purchased the roofing granule plants of the Funkhouser Co. and the quarries and crushing plant of the Columbia Silica Co., at Akron, Ohio. According to a Wausau newspaper interview with L. A. Hatch, manager of the company's plant there, production at the Akron plant is now only about half of that of the Wausau unit, but plans are now being put into effect to increase the production to a great extent. The Akron plant will furnish quartz granules to the eastern markets of the company and it is anticipated colors other than green will soon be applied to the plant's product, it was said. Because of the addition of the new plant, plans have been made by St. Paul officials of the company to transfer Mr. Hatch to St. Paul headquarters within the next few months. Mr. Hatch will take over the supervision of the Akron plant as well as the Wausau unit and will become assistant sales manager of the Minnesota company. Considerable progress is shown in the building of the new warehouse at Wausau, a $200,000 project which is expected to be completed by April 15. The warehouse will provide additional storage space for 200 carloads of finished quartzite.

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Mid-Co. Products Co., Meade, Kan., is contemplating trebling the capacity of its silica plant, and because of the dust hazard the plant will be moved to the old Garlow spur a mile west of Meade. Years ago, when the silica business was started in Meade, the first plant was established at the Garlow spur. A fire destroyed the plant and one was never rebuilt at the point. By placing the plant at the spur the haul on silica from the deposits west of Meade will be shortened. Albert Hantla is in charge of the plant at Meade and also at the Gate, Okla., plant.



Results of a shot in the "soft" rock at the Granite Rock Co. Quarry, Watsonville, Calif.

West Coast Operation Has Many Original Features

Granite Rock Co.'s Quarry and Crushing Plants, Watsonville, California

By Edmund Shaw,
Contributing Editor, Rock Products

THE SAN ANDREAS FAULT, that 400 mile crack in the earth that has been responsible for some of California's earthquakes, passes through the quarry of the Granite Rock Co. at Watsonville. Naturally, the fault movements have done things to the great intrusion of granitic diorite in which the quarry lies. In some places the rock seems solid enough, but in others it has been so fractured and ground by earth movements that there is a mixture of sizes from 20-ton boulders down to dust.

The quarryman from the Middle West, thinking of his own neat limestone quarry face with lines as regular as though they had been drawn with a ruler, might look at such a quarry and throw up his hands and walk away. If he did, he would be much in error. For this quarry is one of the most important in the United States; important not only in the sense that it is the only crushed stone producer of much consequence in a large and highly developed area, but also because it is one of the largest operations in the United States. Under the stress of a strong market, it has produced 220 cars of 57 tons each in 20 hours, or 627 tons per hour, and few plants in this or any other country have done more.

And this production was not all of a few large sizes. The plant produces more sizes than most plants, even in these days of specialization—18 sizes in all, running from 2½-in. r. h. maximum down to ⅛-in.—1/16-in. "chick grits," sold to poultry supply houses. And these are all clean products; for, while the rock is not washed and does not need it owing to the methods used, it is thoroughly "dry-cleaned" and freed from even the dust and breakage caused by handling before it goes into the cars.

Quarry Methods—Blasting

Stripping is done by hydraulicking, the overburden at one point being 60 ft. deep, but in most places is only a few feet deep.

The quarry methods are, of course, the interesting feature of such an operation as

Quarry face, through which an earthquake fault line passes





Dual crushing plant on the main line of the Southern Pacific Lines

this, for it is quarrying, after all, that usually determines the success or failure of a crushed stone business. The methods here are simple but they are the result of 35 years' experience, during which time many experiments have been tried. Today powder experts and others who thoroughly understand breaking rock agree, when they study the conditions, that no other method could be so effective.

Only "snake holes" are used and these are put in at the bottom of the face at about 20 deg. Gardiner-Denver drills, tripod mounted, are used. The steel is hollow with a cross bit, and water applied with 10-15 lb. pressure keeps the hole clear. The depth of the holes varies from 22 to 24 ft.

The spacing of the holes, and this is the peculiar feature, is according to the condition of the rock; and the holes in the solid parts are drilled and shot first. Then the softer portion is drilled, for although the rock in such parts is fractured, it must all be shot before the shovel can work in it, but the holes are farther apart in fractured rock. In ordinary rock the holes are sprung first with 40 lb. to 50 lb. of 60% Trojan powder. Then 450 to 500 lb. of powder are stick loaded or blown into the holes by the method of the Trojan company, and the shot is fired. It is usual to shoot at the end of the day's quarry operation. This gives a chance for loosened pieces to roll down during the night to the "pit" that separates the track from the quarry face. Loading delays are in this way kept at a minimum.

Secondary shooting is by block-holing and by mud-capping or "dobe shots," as they are called here. The dobe shots take more powder, but they save a great deal of time as they may be fired at noon when the shovels are not working. So they are considered quite as economical as block-hole shots.

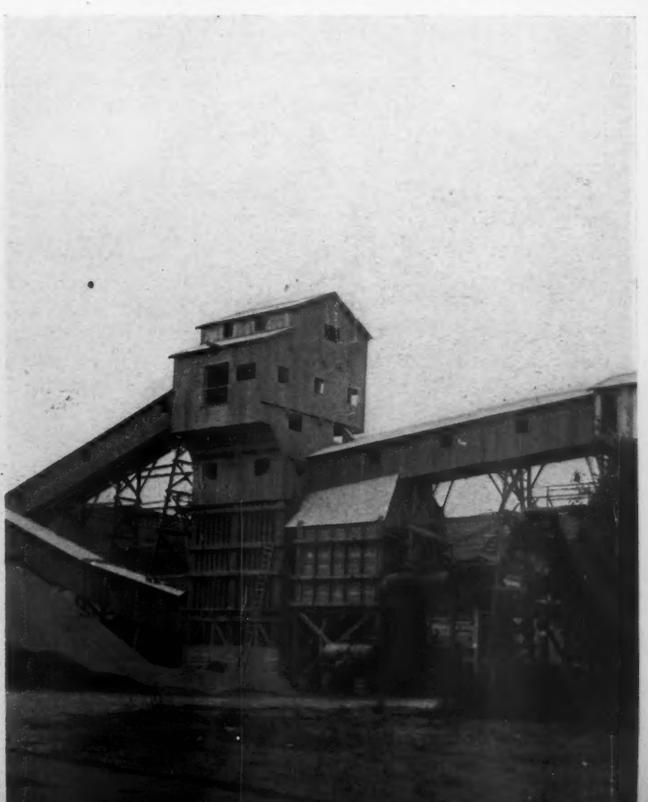
The "pit" mentioned is a part of the quarry system that is unusual if not unique. It is shown in the sketch. The bank is 160 ft. high where the work is going on now, and it stands at 75-80 deg. As the work has proceeded, the main quarry floor has been built up 4½ ft. above the base of the face, leaving a roadway 80 ft. wide or so (to the center of the rail) in which everything that rolls down from the face is caught. The advantage, of course, is that practically everything that rolls down from the high face is caught and held so that it does not interfere with the track. And it must be remembered that, in this quarry, shooting down does not proceed regularly along the length of the face but goes on at different points, according to the nature of the rock and the kind of material that is most in demand.

There is an operating advantage in the shovel loading to cars on an elevated track, as was described in a "Hints and Helps for Superintendents" note in ROCK PRODUCTS,

"Hot" asphalt mixing plant



"Dry-cleaning" and hot-mix plant

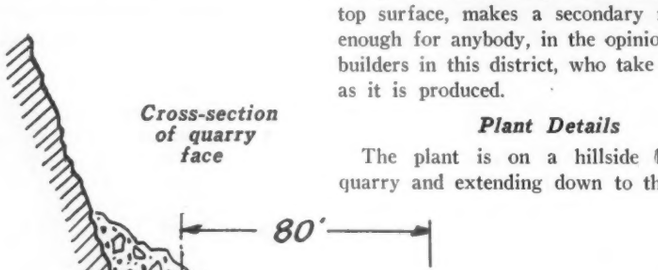


illustrating this operation, several years ago. The shovel dipper does not have to be lowered in order to dump its load to the cars on this elevated track, thus saving time and power in its operating cycle.

The quarry face is approximately a half-circle of 900 ft. diameter. The track parallels it and runs across the half-circle. There are three trains in use, one at each of the two shovels employed and one dumping or on the way in or out. The cars are of "Western," Watt or Koppel make and they are pulled by Porter 15-ton steam locomotives, which use oil for fuel. There is also a Plymouth 14-ton gasoline locomotive. For handling railroad cars the company has one 65-ton and one 30-ton saddle-tank Porter locomotives. Two shovels are in service at the quarry—a 75-B Bucyrus with 2½-yd dipper and a model 37 Marion with a 1⅞-yd. dipper.

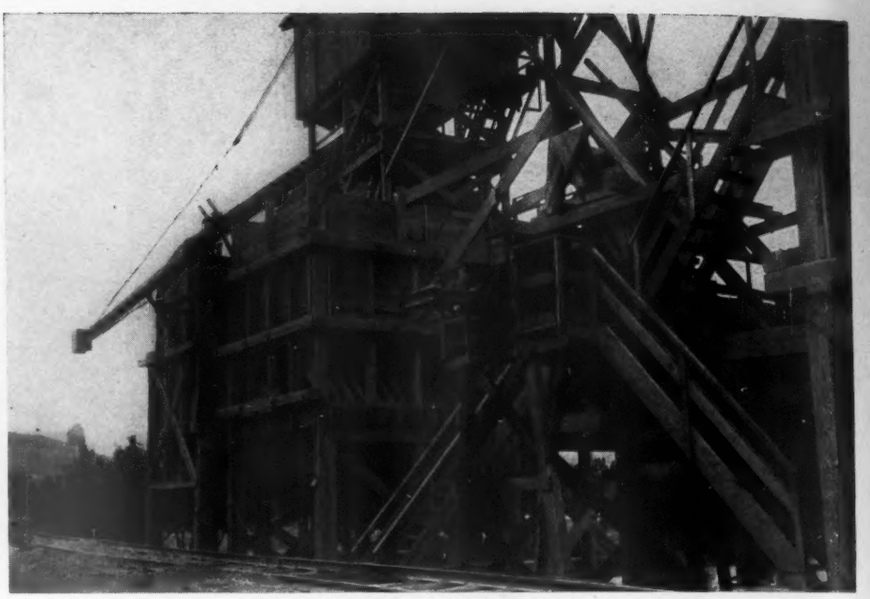
The transportation system has been as carefully worked out as other parts of the operation and the number of cars and number of trains were determined by studies with a stop-watch.

Two materials have been spoken of. They are called base rock and crushed granite rock. The difference is that the base rock consists of the minus 2½-in. quarry fines. It is not waste, for it is all sold for making roads, as it has a high cementing value. Six inches of it, well rolled and given an oiled or black top surface, makes a secondary road good enough for anybody, in the opinion of road builders in this district, who take it as fast as it is produced.



Plant Details

The plant is on a hillside below the quarry and extending down to the railroad tracks. It *had* to be a hillside plant unless the rock was taken some distance; but when it was built, hillside plants were in favor, following the design of ore treatment plants in California. A. J. Wilson, vice-president and manager, says that today he would be glad to swap the hillside location for a flat location with room for economical ground storage.



Detail of "dry cleaning" plant

The plant is in two sections, more or less alike in machinery and making about the same products. This is another feature borrowed from mining practice, the idea being that half the plant could be shut down when demand was light. But Mr. Wilson says that in the long run it has not been found economical to run half the plant. There is only a small part of the total cost cut out by doing this. Since hillside sites and duplicate machinery are still advocated in some quarters, it is well to have the opinion of one who has tried them thoroughly, one who has been brought up in the quarry business, too.

Screening Details

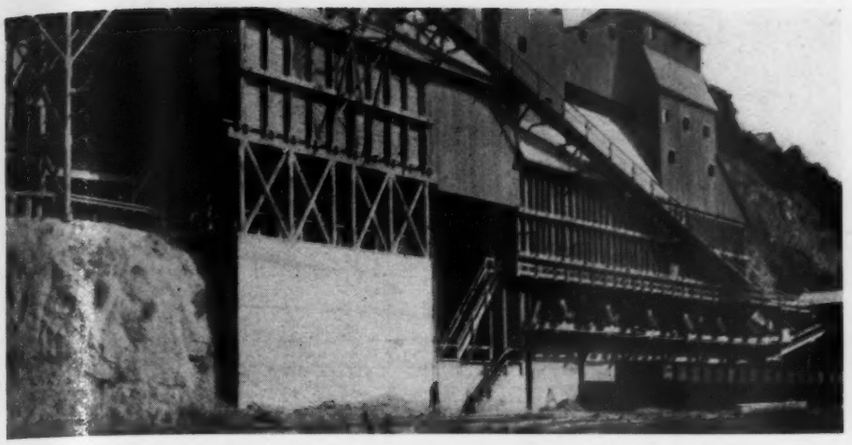
Owing to the hillside location, there is one excellent feature on both sections, a long grizzly with 30-ft. T-iron bars that makes the first separation. All the oversize goes to the primary crushers, a No. 8 McCully on one side and a No. 7½ on the other. The undersize from both grizzlies goes to a 48-in. by 20-ft. revolving screen with 2¼-in. square holes and a jacket with 1-in square holes. The 2¼-in. screening is Rol-man steel rod mesh.

The oversize of these screens goes to crushers, a Symons 4-ft. cone crusher and a 6-in. McCully fine reduction crusher on one side and a No. 4 Telsmith on the other. This is the final crushing, and everything is then sized for the bins. Most of the sizing is done with Robins vibrating screens, which have largely replaced the revolving screens formerly used. Sizes regularly made are 2¼—1⅝-in., 1⅝—½-in., 1-in.—½-in., ½—⅜-in., ⅜—⅛-in., 5/16—⅛-in., ¼—⅛-in., ⅛—dust.

This is done in what was the original plant. Some years after it was built, a re-



Housing for "re-cleaning" screen; waste goes to car in foreground



Re-crushing plant and car-loading bins

grinding plant was added to make more and finer products. The feed for this comes from the bins of the original plant, and any or all of the above sizes may be taken out on a conveyor belt to the regrinding plant. Here are three crushers, two 6-in. McCully fine reduction crushers and a 4-ft. Symons cone, and any one or all of them may be used. The crushers discharge go to a 4x8-ft. Niagara vibrating screen with 1½-in. and ⅞-in. mesh decks. The oversize goes back to the crushers and the undersize is further treated on a 4x8 ft. Link-Belt vibrating screen, a 4x6 ft. Niagara screen and a 42 in. by 14 ft. Symons screen. The products of the plant (usually made) are 1½—⅞-in., ⅞—9/16-in., 9/16—5/16-in., ⅜—⅛-in, 5/16—⅛-in., ¼—⅛-in., ⅛—1/16-in., and 1/16—dust.

Mixing Belt—Re-cleaning

All the products are loaded out on a mixing belt and can be run to a 4x10-ft. Symons shaking screen with 5/16-in. mesh above and ⅛-in. mesh below. This is solely for cleaning out dust and breakage before the material goes to the car. There is an unusual and very neat way of handling the undersize of this screen. It falls on a slow-moving horizontal belt 48-in. wide. This is set to carry the minus ⅛-in. fines to a 14-in. belt that returns them to the plant circuit and so to the bunkers. A flap chute is provided so that the plus ⅛-in. material can be loaded directly into cars or returned to the plant circuit.

There is still another plant, and an important one, as only "quality" products are permitted to go out, a plant in which stock piled material is cleaned and screened. This is about a mile from the crushing plant, for there is no flat place on which stockpiles can be placed any nearer. Transportation to stockpiles is in standard gage cars, and an Ohio locomotive crane aids in loading in and out.

At the re-cleaning plant the material, already sized, goes into two pits that make a W-section. At the bottoms of these are pan conveyors, and an A-section piece in the bottom helps to keep the conveyors fed evenly. Both pan conveyors discharge to a 36-in. belt that lifts the material to the top of the plant.

The flow-sheet of this part of the plant is not so different from that of a gravel washing plant, for the material first goes to a regular 48-in.x12-ft. gravel scrubber. But it is run dry, the purpose being to jar off the dust. The "dry-cleaned" material is then passed over a 4x10-ft. Robins vibrating screen with two decks. The oversize goes to cars, the middle size goes to a fine rock bunker, and the smallest size to the dust bunker. The fine rock and dust are only the fines made by handling and by the dry cleaning. Both products are readily saleable for road-surfacing, walks and the like, and a very up-to-date use for the dust has been found in giving plasticity to concrete. The scrubber may be by-passed with material that is on its way to a hot asphalt plant.

The company does a considerable business in bituminous paving material prepared in this plant.

The writer found the visit to this plant very interesting for personal reasons. It is one of the outstanding plants of the Pacific Coast, and its builder, A. R. Wilson, was one of the outstanding men of the industry. His son, known to everyone as "Jeff," was "raised" in the quarry business, as he says, by the men who are working there, for most of the men have been with the company from 18 to 35 years. One has only to talk with them to see that long service has by no means changed their outlook, for everything looks neat and ship-shape, and they are planning as steadily for the future as though they expected to put in another 35 years. Labor troubles have never been known. One wishes that there could be more industries in which one could find the loyal service and the friendship that are found here.



"Dry-cleaning" stone plant and stock piles of top-dressing stone

Commercial Aggregate Producers and Contractor Producers Agree on Definitions

Code of Fair Competition for Crushed Stone, Sand and Gravel, and Slag Industries Clarified

THE PERPLEXING PROBLEM of overlap between Code 109 for the aggregates industries, and Code 244 for the construction industry apparently was near solution on March 21, 1935, when a subcommittee of the two code authorities, at a public hearing, presented definite recommendations to the Administrator.

The subcommittee included John Prince, chairman; H. V. Owens, Robert J. Potts, H. E. Rodes, W. M. Stoner, and Porter Yett, representing the aggregates code; and M. W. Watson, E. W. Everly, D. G. Hansen, G. C. Holliday, C. W. Joslin and L. E. Ray representing the construction code. Other members of the committee representing the Crushed Stone, Sand and Gravel, and Slag Industries were: Anson S. Blake, Eric Ryberg, F. P. Spratlen, Jr., E. Guy Sutton and G. W. Hamilton. The group agreed unanimously that production of aggregates by a contractor-producer for his own use in a bona fide construction contract held in his own name should be governed only by the construction code; and likewise, that materials covered by the aggregates code entering into a materials supply contract should be governed only by the aggregates code.

Local Determination of Proper Code

The subcommittee agreed further that no definition could be formulated for national application which would distinguish clearly between the aggregates code and the construction code. The complete resolution as read into the record by Otho M. Graves, at the request of Deputy Administrator Berry, follows:

WHEREAS, the Code Authority for the Crushed Stone, Sand and Gravel, and Slag Industries is of the opinion that certain provisions of the code and the administration thereof are not consistent with the proper interests of the contractor-producer members of these industries; and

WHEREAS, the Code Authority is desirous of so coöperating with the contractor-producer members of these industries as will effect harmonious and equitable relationships between them and the other members of these industries; and

WHEREAS, on February 13, 1935, an informal hearing was held in Washington, D. C., with Deputy Administrator Berry presiding, as a result of which, with the approval of the Deputy Administrator, a committee was created composed of equal representation from the Code Authority for Code No. 109, the Divisional Code Authority for General Contractors, and the National Association of Portable Crushed Stone, Sand and Gravel Producers, charged with the responsibility of devising ways and means of effecting fair, reasonable and equitable administration of the Code as to all members of the industries with due regard to the particular problems confronting the contractor-producers; and

WHEREAS, a meeting of this joint committee was held in Washington, D. C., on March 20, 1935, during the morning thereof in Room 2062 of the Department of Commerce, resulting in the appointment of a subcommittee thereof which met on the same day in the afternoon and evening thereof at the Carlton Hotel; and

WHEREAS, it clearly developed that the single purpose and intent of each of the members of the subcommittee was to effect a solution of the contractor-producer problem as would be equitable and fair to all members of the industries covered by Code No. 109 and Code No. 244, Supplement No. 1, now therefore be it

RESOLVED, that in the judgment of this subcommittee the production by a contractor-producer of the commodities of the industries covered by Code No. 109 for his own use in a bona fide construction contract held in his own name shall not be governed by the provisions of Code No. 109 but, on the contrary, shall be governed by Code No. 244, Supplement No. 1; and be it further

RESOLVED, that the commodities of the industries covered by Code No. 109 entering into a materials supply contract shall be governed only by the provisions of Code No. 109; and be it further

RESOLVED, that, in the opinion of this subcommittee, no definition can be formulated for national application which will clearly distinguish between those commodities which should be covered by Code No. 109 and which should be covered by Code No. 244 as set forth in the foregoing resolution, but, on the contrary, such distinguishing definitions can be determined by each of the several states concerned and applicable within each of those several states, thus permitting local determination of the code which should govern the production and sale of these commodities according to the type of contract involved; and be it further

RESOLVED, that the National Recovery Administration permit, authorize and instruct the Code Authorities of Code No. 109 and Code 244, Supplement No. 1, to enter into a binding and legal agreement by and between themselves, through the terms of which there will be established in each state so desiring a state committee. Each of these state committees shall consist of three members appointed by the Code Authority for Code No. 109 and three members appointed by the Code Authority for Code No. 244, Supplement No. 1, these six to elect a seventh member who shall act as chairman. Upon these state committees shall rest the responsibility and duty of determining, upon petition or complaint by any interested party, whether the supplying of the commodities of the industries covered by Code No. 109 actually falls within the meaning and intent of a bona fide construction contract or a materials supply contract as hereinbefore set forth. The decision of such state committees shall be subject to appeal to a national committee composed of three members of the Code Authority for Code No. 109 and three members of the Code Authority for Code No. 244, Supplement No. 1, these six to elect a seventh who shall act as chairman. The decision of this national committee shall be final and binding upon the interested parties except as appeal may lie with the National Recovery Administration and the courts of proper jurisdiction.

In concluding his remarks, Mr. Graves expressed hope that the Administration would view favorably the efforts of the two code authorities to adjust their differences on an amicable basis.

John E. Skilling of the legal division of NRA raised the question as to why no standard set of rules or definitions could be devised to cover the entire country. In reply, Mr. Graves stated that this was exactly the reason why no decision had been reached heretofore, and that experience during the past 18 months indicated clearly the impossibility of adopting rules covering the entire United States. He stated that solution of the problem should be a matter of industry judgment, and he was convinced that any three representative producers working with three representative contractors on a committee, would know exactly what type of contract in their particular state would fall in each of the two groups set up in the resolution.

In reply to a question regarding legality of the enforcement machinery which the subcommittee proposed to set up, Mr. Graves replied that the resolutions should be interpreted as to their intent and the details of administration could easily be developed at a post-hearing conference.

No Dissension

L. E. Ray, chairman of the contractors'

Practical Coöperation

A COMMITTEE of 11 producers representing the crushed stone and sand and gravel industries met a similar committee representing highway contractors, contractor producers and portable plant producers in a two-day session in Washington, D. C., March 19 and 20. The problem to be settled was one which has caused many headaches in the territory west of the Mississippi River—should the contractor-producer, or the contractor who produces his own aggregates for a specific job, come under the Code 109?

That this question was settled to the satisfaction of all, including the U. S. Bureau of Public Roads and the Association of State Highway Officials, certainly is a hopeful sign, and augurs well for the future peace and prosperity of the construction industry.

—THE EDITOR.

subcommittee, concurred in all Mr. Graves' statements and emphasized the impossibility of arriving at a definition to cover the entire country. Similar expressions of opinion were voiced by H. E. Kirk, of the Associated General Contractors; Richard Elliot, representing the portable producers; N. W. Watson, general contractor, Topeka, Kan.; Robert J. Potts, producer, Texas; and Porter Yett, producer, Oregon.

Charles Ross, chairman of the committee on legal affairs of the American Association of State Highway Officials, expressed his personal satisfaction at the solution of an annoying problem and stated definitely that, in his opinion, the State Highway Officials would heartily endorse the resolutions as presented. He suggested, as a matter of administration, that the state committees be instructed to submit a general outline of their definitions for consideration of the two Code Authorities and the Administration.

Others commenting in favor of the resolutions included E. W. Everly, president of the Associated Contractors of New Mexico; G. C. Holliday of the Iowa Gravel Contractors Association; V. P. Hess, Kansas; C. W. Taggart, of the Taggart Construction Co., Cody, Wyo.; C. W. Joslin, representing the contractor-producers of Washington, Idaho, Oregon, and Montana; G. L. Minor, representing the contractors of New Mexico and Arizona; and W. W. Clyde, representing the contractors of Utah.

Complete absence of objections to the resolutions as submitted by the subcommittee indicates that their general intent undoubtedly will be acceptable to the Administration.

Changes in Definitions

The following specific recommendations for changes in the definitions of Article II of the aggregates code were read into the record of Mr. Graves:

ARTICLE II—DEFINITIONS

Section 1. *Industries.*—The term "industries" as used herein includes the quarrying, and/or crushing, and/or processing, and/or recovering of stone, sand, gravel, and/or slag for any or all purposes, *except as noted in Section* 5 (*a*) *and* 5 (*b*) *of this article,* and the producing and/or processing for any or all purposes of the products of such other industries as with the approval of the President may from time to time be governed by the provisions of this code.

Section 5. *Producers.*—(*a*) *Crushed stone producer.*—The term "crushed stone producer" as used herein includes any member of the industries engaged in the quarrying, and/or crushing, and/or processing of stone for any or all purposes, *except the production of crushed stone for use by the producer thereof in the manufacture of lime or cement, the production of dimension building stone and the recovering or processing of stone encountered in the grading or excavation quantities and used in the prosecution of a specific project, shall not be included.*

(*b*) *Sand and gravel producer.*—The term "sand and gravel producer" as used herein includes any member of the industries engaged in the recovering and/or processing of sand, and/or gravel for any or all purposes, *except the recovering and processing of sand and/or gravel encountered in the grading or excavation quantities and used in the prosecution of a specific project.*

Decision on Pulverized Limestone Postponed

The exact status of chemical and metallurgical limestone, and pulverized limestone in their relation to the aggregates code and the lime code has never been determined. A joint committee composed of Russell Rarey, A. R. Couchman, E. J. Krause, A. W. Worthington, and Thomas McCroskey for crushed stone, and S. W. Stauffer, B. L. McNulty, Reed Bye, C. C. Loomis, and G. J. Whelan for lime reached a tentative solution of this problem on March 20, 1935. They agreed that chemical and metallurgical limestone, and limestone screenings 10-mesh or larger definitely belong to the crushed stone industry; and, in the absence of conclusive data, recommended that decision regarding pulverized or processed limestone be postponed.

The text of their resolution, as read into the record by Mr. Graves, follows:

WHEREAS, Section 1 of Article II—Definitions of the Code of Fair Competition for the Crushed Stone, Sand and Gravel, and Slag Industries defines the term "industries" as including "the quarrying, and/or crushing, and/or processing, and/or recovering of stone, sand, gravel, and/or slag for any or all purposes," and

WHEREAS, Section 5(a) of the same Article of the Code defines the term "crushed stone producer" as including any member of the industries "engaged in the quarrying, and/or crushing, and/or processing of stone for any or all purposes," and

WHEREAS, these definitions obviously are general and broad, and susceptible of varying interpretations as to their exact meaning, as the result of which considerable doubt and confusion exists in the minds of producers of chemical, industrial and agricultural stone and processed limestone for chemical, industrial and agricultural purposes as to proper code coverage and as to their exact status under the definitions above referred to, and

WHEREAS, a proposed Code of Fair Competition for the Ground Limestone, Ground Mollusk Shell, and Marl Industries was drafted but was not submitted to the National Recovery Administration, and

WHEREAS, a canvass of the manufacturers of processed limestone made by the Crushed Stone Code Authority in August, 1934, failed to crystallize existing sentiment sufficiently to warrant the establishment of a division for such processed limestone under Code 109, and

WHEREAS, during the past year an independent attempt by manufacturers themselves has been made to crystallize sentiment among the manufacturers of processed limestone in regard to Code coverage with only partial success, and

WHEREAS, in connection with the public hearing scheduled for March 21, 1935, on definitions contained in the Code of Fair Competition for the Crushed Stone, Sand and Gravel, and Slag Industries, that Code Authority appointed a committee to meet with a similar committee representing the Lime Code Authority, and

WHEREAS, the Joint Committee canvassed members of the processed limestone industry with a view toward determining proper Code coverage for, first, processed limestone having a maximum particle size of 10-mesh or less and, second, limestone having maximum particle size of 10-mesh or larger, with the result that the great majority of replies, both in number of producers and in tonnage produced, indicated a preference for the inclusion of material minus 10-mesh in size under the Lime Code and further with the result that the great majority of replies, both in number of producers and tonnage produced, indicated a preference for the Crushed Stone Code insofar as material 10-mesh or larger is concerned, and

WHEREAS, the committee has studied the results of an investigation made with reference to chemical and metallurgical stone showing that a substantial majority of the producers of this type of stone, representing approximately 24,000,000 tons during the year 1928, favor the retention of this product under the Crushed Stone Code, now therefore be it

RESOLVED, that the committee recommends:

1. With respect to chemical and metallurgical stone, Sections 1 and 5(a) of Article II be clarified so as specifically to include chemical and metallurgical stone.

2. With regard to limestone screenings having a maximum particle size of 10-mesh or larger, that Sections 1 and 5(a) of Article II be clarified so as specifically to include this type of material.

WHEREAS, sentiment of producers of pulverized and/or processed limestone has not at this time been clearly established insofar as desired code coverage is concerned; and

WHEREAS, there is no disposition on the part of either the Code Authority of Code 109 or of the Code Authority of Code 31, to influence the producers of pulverized and/or processed limestone as to code coverage, now therefore be it hereby

RESOLVED, that recommendation be made that the provisions of Code 109 be stayed insofar as they apply to processed and/or pulverized limestone having a maximum particle size of minus 10-mesh when produced by a process other than the normal crushing and screening operations of a crushed stone plant, in order that the industry may have an opportunity at a public hearing to determine in an orderly manner whether it desires to operate as a Division of the Crushed Stone Code or as a Division of the Lime Code, with such modifications of the chosen Code as may be determined by the industry.

Basic Slag as Fertilizer

Charles J. Brand, executive director of the Fertilizer Recovery Committee, spoke in behalf of the companies in the fertilizer industry that are marketing basic slag for direct application to the soil. He stated that this material competes directly with superphosphate as a source of phosphoric acid, and that 20,000-30,000 tons of the material is used annually. He pointed out further that the use of basic slag for this purpose began in 1882. In Germany, three tons of basic slag are sold for each ton of superphosphate. In order that basic slag be included under the fertilizer code, Mr. Brand recommended that the slag definition be amended to include "provided, however, that when basic slag is offered for sale for application to the soil" the producers should come under the provisions of the fertilizer code.

Executive Secretary of Code Authority of Aggregate Industries Makes West Coast "Good Will" Circuit

NO SMALL PART of the successful outcome of the public hearing in Washington, D. C., before NRA, to iron out some of the difficulties encountered in administration of the code for the crushed stone, sand and gravel and slag industries was attributable to a recent "good will" trip of Vincent P. Ahearn, executive secretary of the Code Authority, to the Rocky Mountain and West Coast states. For it is in these states that the problem of the contractor producer had become acute. The solution of this problem is related elsewhere in this issue in a report of the Washington hearing.

The trip was an outcome of the recent convention of the aggregate industries in Chicago. The Far West members considered their problems more or less peculiar, and it was decided that producers in this section needed a better understanding of the code and a better acquaintance with the executive members of the Code Authority. Unfortunate circumstances prevented the chairman of the Code Authority, Otho M. Graves, from going with Mr. Ahearn as was originally planned. It was the privilege and good fortune of the editor of ROCK PRODUCTS to be invited by the West Coast producers to be Mr. Ahearn's traveling companion, so what is written here comes from first-hand knowledge.

Helena, Mont.

The two left Chicago February 23, and the first stop was at Helena, Mont., where a meeting of producers was held on February 25. A representative gathering, composed almost entirely of contractor producers, listened attentively to an explanation of the code, the public works program, and other relevant matters. It was the unanimous opinion of these producers that the code had been useful and helpful up to the time of the Administrative Orders which permitted bidders to cut prices up to 15% on government contracts, and the later one which exempted producers who operated pits on publicly owned, or leased, lands, from the open-price provisions of the code. The dissatisfaction of these producers was not with the code itself, but with these Administrative Orders of NRA which nullified the code.

Resolutions were adopted to the effect that the producers of Montana, irrespective of whether they were permanent plant operators or contractor producers, desired to remain under the code. Resolutions were also adopted favoring the construction of public works by the contract system and condemning government competition both with contractors and producers. Similar resolutions were adopted at subsequent meetings.

George F. Jacoby, president of the Helena Sand and Gravel Co., was chairman of the meeting, and was host to the visitors; and an admirable host was he. There was an opportunity to visit his plant and to see a little of this interesting city. Porter W. Yett, member of the Code Authority, Portland, Ore., joined the visitors here and continued with them to Seattle, Wash., and Portland.

Seattle, Wash.

From Helena the visitors went to Seattle, Wash., where they arrived March 1 for a three-day stop. Here they were met and entertained by a local committee including George W. Gauntlett, Pioneer Sand and Gravel Co., member of the Code Authority, Dr. Walter A. Moore, Crosby Sand and Gravel Co.; George R. Stirrat, Independent Asphalt Paving Co., chairman of the local district committee, and J. T. Heffernan, Jr., Glacier Gravel Co.

The Seattle meeting was similar to that at Helena, and the others which followed later. In very few instances was there any well-founded criticism of the code, except that NRA had put many obstacles in the way of its effective working. In this section production of sand and gravel has been pretty well concentrated at the modern plant of the Glacier Gravel Co., the other producers confining their activities for the present to the distribution of this material.

The entertainment included a yachting trip up Puget Sound to Shelton, Wash., where a modern wood pulp mill was inspected. The host was W. Foss, of the Foss Tug and Barge Co., Seattle, who is credited with supplying the essential details of the famous "Tug-Boat Annie" stories. On the return trip a stop was made at Olympia, Wash., where a dinner meeting was held, at which the State Director of Highways, Lacey V. Murrow, his assistant, J. W. Davis, and the State PWA Engineer, E. R. Hoffman, were guests of honor. In addition to talks by the visitors an interesting and instructive round-table discussion took place.

Vincent P. Ahearn



Portland, Ore.

At Portland, Ore., an entertainment committee comprising Drake C. O'Reilly, Diamond O Navigation Co.; S. S. Montague, chairman of the local district committee; Raymond D. Hoyt, United Contracting Co., and John R. Reese, Columbia Contract Co., took the visitors on a sightseeing tour of the harbor, and on the following day, Sunday, to visit the Bonneville dam on the Columbia River above Portland.

There was an excellent turnout of representative producers, including several from eastern Oregon and Idaho. As usual, Mr. Ahearn explained the code in detail and left the Portland district members much better informed and much better "sold" on the code than when he arrived. The situation in Portland has been difficult because about the only worthwhile job to come up there in the last two years was the Bonneville dam, and to supply aggregates for this the contractor constructed a new plant, notwithstanding an idle



(1) Messrs. Ahearn, Geo. F. Jacoby, Porter W. Yett, at Helena, Mont.; (2) Character study of Secretary Ahearn as he watches a contract bridge game on yacht on Puget Sound; (3) Porter W. Yett; (4) Geo. R. Stirrat; (5) Messrs. Stirrat and Ahearn; (6) J. C. Klinker; (7) and (8) Party at Shelton, Wash., saw and pulp mill; (9) Dr. Walter A. Moore and J. T. Hefferman, Jr.; (10) Drake C. O'Reilly (left) and some of party at Bonneville dam; (11) S. S. Montague; (12) Party at Golden Gate bridge, San Francisco; (13) Chas. M. Cadman and Anson S. Blake; (14) Eric Ryberg, center; (15) Golden Gate bridge

capacity of several times over the demand. This new plant is described on the pages following this article.

San Francisco, Calif

The meeting at San Francisco, March 5, was held under the auspices of the Rock, Sand and Gravel Producers Association of Northern California, of which Charles M. Cadman, Pacific Coast Aggregates, Inc., is president. This turned out to be the largest meeting of all—about 70 producers being present. Prior to the luncheon meeting at which Mr. Ahearn and the editor spoke, the association had met and elected the following officers for the ensuing year: President, Charles M. Cadman; vice-president, Anson S. Blake, Blake Brothers Co.; executive secretary, E. J. Goodpastor; treasurer, A. K. Humphries, Atlas Olympia Co.; assistant treasurer, R. G. Frith.

The entertainment included a trip to the Golden Gate Bridge and to various points of interest about the city; not to mention too seriously several night excursions under the personal supervision of A. J. Wilson and John E. Porter, of the Granite Rock Co., Watsonville, Calif., who showed themselves delightful hosts, quite familiar with many interesting places in a most interesting city.

Los Angeles, Calif.

The meetings at Los Angeles showed the code is not working so well in southern California as in the northern part of the state, but they were well attended and the discussions were lively. Here the conflict, if there is one, is between the so-called small producer and the larger ones, and as to a proper differential for ready-mixed concrete.

The visitors were the guests of J. C. Buckbee, Consolidated Rock Products Co., mem-

ber of the Code Authority, at the Jonathan Club, where various committee meetings and a general meeting were held. Claire Newberry, Granite Materials Co., Los Angeles, was chairman, and P. G. Whitman, secretary. These gentlemen, C. A. Banks, Blue Diamond Co., H. F. G. Pelsue, and others were hosts on visits to the San Fernando and San Gabriel valleys, where some idea of the way the plants were dotted over the landscape was obtained.

Salt Lake City, Utah

At Salt Lake City, Utah, March 10 and 11, the visitors were the guests of a most generous host, Eric Ryberg, Utah Sand and Gravel Products Co., member of the Code Authority, and chairman of the local district. Here a majority of the score or more producers at the meeting were contractor producers, and their attitude toward the code was similar to that of the Montana producers at Helena. Mr. Ryberg personally conducted the visitors to various points of interest about the city, and the visit, unfortunately, proved all too short.

Denver, Colo.

The program for the meetings at Denver required strenuous efforts on the part of Mr. Ahearn, as it called for three separate talks, to one of which the Governor, the Mayor, the State NRA Compliance Director, State Highway and U. S. Bureau Public Roads officials and other distinguished guests had been invited. Arthur L. Allen, contractor and slag producer, Pueblo, Colo., presided as chairman of the local district committee and member of the Code Authority. He was ably supported as a member of the entertainment committee by E. P. Spratlen, Jr., J. W. Brannen Sand and Gravel Co., member of the Code Authority, and other local producers. The meetings of industry members developed lively discussions, and interested listeners were treated to a good example of the mettle of their Executive Secretary Ahearn, in defending the code against all assaults, whenever the circumstances required it. All the meetings were a pronounced success, in the opinion of local producers, who were very appreciative of Mr. Ahearn's visit.

The entertainment program included a motor trip into the mountains and to points of interest about the city; and a very specially privileged visit to the United States Mint, which was inspected under the personal supervision of the superintendent, from A to Z.

Des Moines, Iowa

The last "port of call" was Des Moines, Iowa, March 14, where about 25 producers met for an all-day discussion, which at times was quite heated, as this is one of the territories where permanent plant operators and contractor producers have had considerable difficulty in meeting common problems. W. M. Stoner, Western Sand and Gravel Co., Lincoln, Neb., chairman of the regional committee, member of the Code Authority, presided; and after listening to Mr. Ahearn for nearly the whole day, the group parted with a much better understanding of the code, and some of the difficulties of its administration, and with plenty of goodfellowship.

Conclusions

The editor, as recorder of this trip, would be remiss in his duty and his opportunity if he did not pay a sincere tribute to the remarkable patience, tact, diplomacy and ability of the Executive Secretary of the Code Authority of the Crushed Stone, Sand and Gravel and Slag Industries. In every instance he answered all questions to the apparent satisfaction of everyone, and in the opinion of many producers, as well as of the editor, he left a host of new and understanding friends for the code, and for a continuance of coöperative associations, code or no code. So well pleased were the producers in the Far West that they probably will be quite insistent that the Code Authority send the Executive Secretary on a similar good will tour every year.

The editor regrets that he is unable to mention and thank all various producers and hosts by name, both in his own behalf and on behalf of Mr. Ahearn. Both are indebted to them for much helpful information and suggestions and for many a good time.

Production of 300,000 Cu. Yd. of Aggregate for the Bonneville Dam Project

By W. A. Scott,
Portland, Ore.

THE ONLY construction job of any size in the last year or two in the Portland, Ore., district is the PWA-U. S. Army Engineer project for a dam and power plant on the Columbia River some 40 miles above Portland, known as the Bonneville dam. Although Portland has probably about as large an excess of producing capacity in the sand and gravel industry as any section of the United States, the contractor for the dam and power plant passed up ample opportunities to buy from local producers or to lease any of the existing plants. The chief reason, presumably, was that U. S. Army Engineer specifications for sand and gravel are notoriously hard to meet, and possibly the contractor felt that the only escape was to assume full responsibility by making the aggregates himself in a plant especially designed to meet these specifications, which require much more very fine sand than has been customary in other specifications.

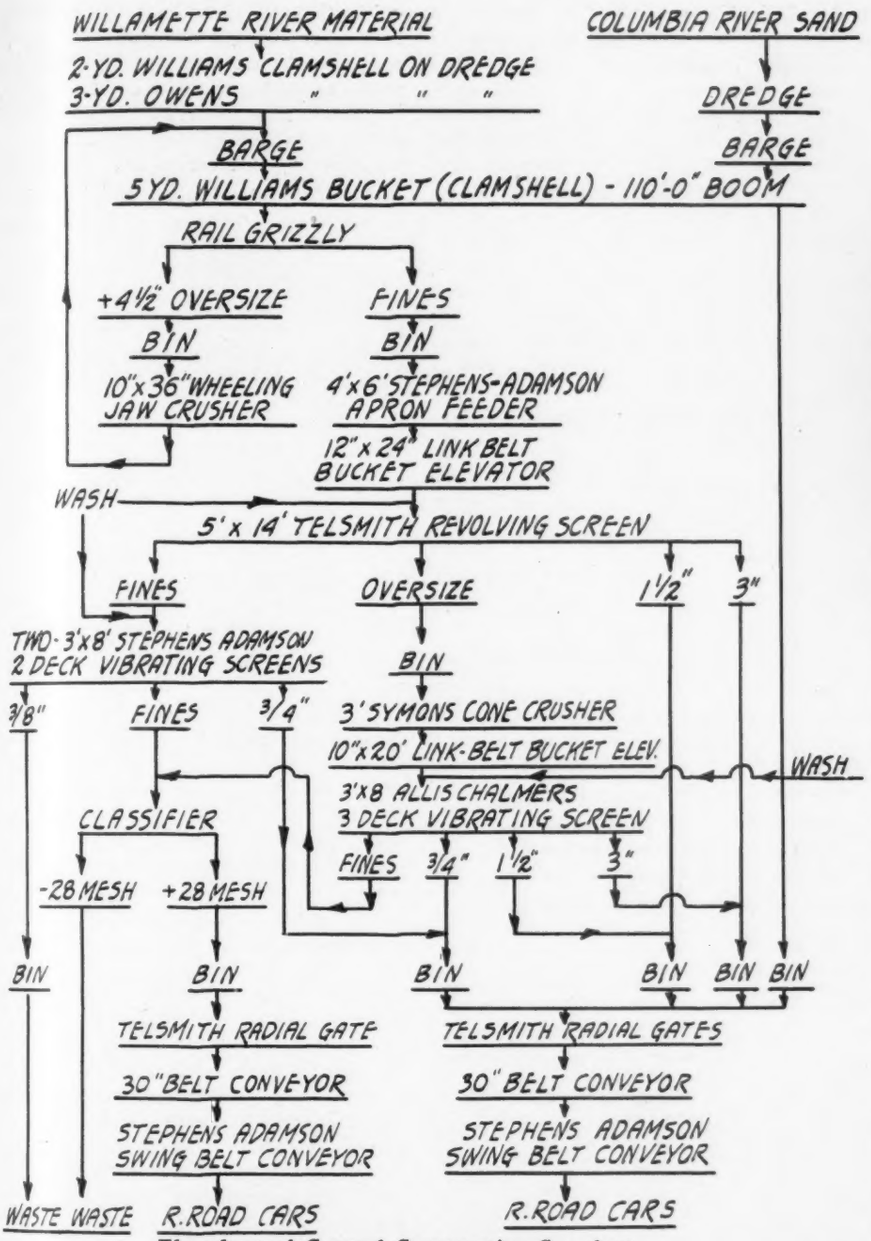
The General Construction Co., Seattle, Wash., and the J. F. Shea Co., Portland, Ore., are closely allied in the building of the concrete power house and navigation locks on the Columbia river, as one of the units of the government's Bonneville project. The construction contract was awarded to the General-Shea Co., representing a consolidation of the two concerns. Under a subcontract, the General Construction Co. is producing graded sand and gravel at Portland and delivering it in railroad cars to General-Shea Co. at Bonneville. The amount required under the latter's contract is estimated at 300,000 cu. yd.

New Processing Plant

After a decision had been made to draw on the deposits in the Willamette and Columbia rivers for sand and gravel, the General Construction Co. built a new processing plant on the east bank of the Willamette, in



Portland, Ore., plant of the General Construction Co.



Flowsheet of General Construction Co. plant



Unloading derrick of Portland plant

Portland, which was placed in operation on October 12, 1934. The selection of this site, contiguous to the railroad yards of the Union Pacific Co., was followed by arrangement with that company for the transportation of the graded aggregates to Bonneville.

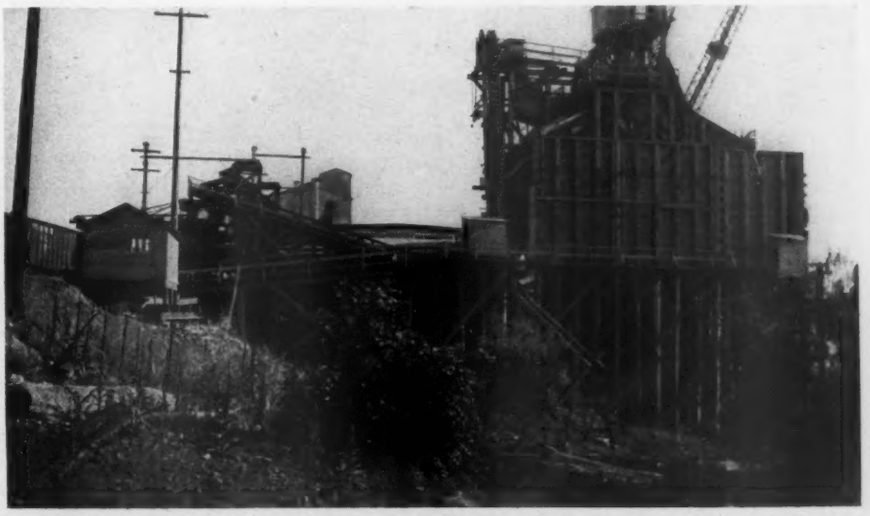
Material Dredged from River Beds

All the gravel and a part of the sand are taken from the Willamette between Portland and Oregon City. In this work, dredges, equipped with clamshell buckets and power shovels load river-run material on barges which are towed to the plant for classification and washing.

The principal part of the sand is obtained from deposits on the Columbia river, above Vancouver, Wash. It is recovered by a suction dredge, equipped with a Byron Jackson 10-in. pump, operated by a Diesel engine. The pump discharges into a dredge flume, the material flowing thence to a flat screen, giving a sand product of ¼-in. minus, from which the silt has been eliminated by overflow. This is loaded on barges and towed to the Portland plant. As this clean, graded sand requires no processing, it is placed in plant storage and transported to Bonneville as required.

Shovel Dredge "Titan"

The General Construction Co. leased dredges, barges and tow boats for operations on the two rivers from Swigert-Hart Co. and Harold Blake of Portland. Included is the dredge "Titan," equipped with a 3-yd. steam shovel. This was improved by building a new hull and reconditioning the equipment. It was put in service on the Willamette river in January, replacing three 2-yd. clamshell diggers. The improved "Titan" and attendant barges have the capacity to extract and deliver to the plant about 2500



Another view of Portland plant

cu. yd. of river-run material per day, thus equalling the plant's processing capacity. Willamette river digging operations are served by six 300-yd. barges; those on the Columbia by two barges of 600 yd. each.

Some of the heavier equipment formerly used on the Owyhee and Ariel construction work was utilized by the General Construction Co. in building its sand and gravel plant. A brief description of the processes, in proper sequence, is given in the following paragraphs.

Plant Operations

The barges are unloaded at the dock by a revolving derrick, equipped with a 110-ft. boom and a Williams 5-yd. clamshell bucket. The bucket loads are discharged on to a rail grizzly, the undersize passing by gravity through the receiving hopper to a Stephens-Adamson 4-ft. by 6-ft. apron feeder. The latter gives a continuous discharge into a Link-Belt bucket elevator of the capacity of 250 cu. yd. per hour.

The elevator feeds the material into a Telsmith revolving screen, 16 ft. long and 60-in. diameter. It has three sections having 1½-in. openings, and one section with 3-in. openings. A jacket screen, 12 ft. long and 84-in. diameter, has ¾-in. apertures. The products of the 3-in. and 1½-in. screens are passed directly to the coarse aggregate bins. The jacket screen undersizes, comprising gravel of ¾-in. minus and sand, are fed into two Stephens-Adamson 3-ft. by 8-ft. double-deck vibrating screens. The vibrators for each unit consist of a ½-in. mesh upper deck and a ¼-in. mesh lower deck. The undersize of the ¼-in. mesh lower deck screens is spouted to two sand settling boxes in which large sized sand wheels are operated. By this method a clean Willamette river sand is recovered. The coarse oversizes of the two sets of vibrators are passed by chutes to a Symons 3-ft. cone crusher. The finer material thus produced is delivered by a second Link-Belt elevator to an Allis-Chalmers set of 3-deck vibrating screens. The three products of this classification consist of 1½-in., ¾-in. and ¼-in. aggregates. The fine sand and slimes from this machine pass to the settling boxes and sand wheels for the recovery of clean sand.

Belt Conveyors for Car Loading

Aggregates in separate grades are drawn from the plant bins onto two parallel lines of 30-in. belt conveyors that extend out to the side of the plant that faces the railroad yards. Each conveyor discharges into the feed hopper of a swing conveyor, the latter loading aggregates into gondola cars on either one of two adjacent tracks. The 24½-ft. arm of the swing conveyor moves radially from a center base. It carries a 30-in. conveyor belt, operated by a 10-hp. motor at a speed of 400 ft. per min. and has a maximum capacity of 300 cu. yd. per hour. With both units in operation, two 40-yd. cars at a time may be loaded. This car-loading equipment was designed by the Stephens-Adamson Manufacturing Co. for the work described. The problem of moving gondola cars to position for loading was met by installing a Washington Iron Works 3-drum hoist.

The electric drives in the plant require a connected load of 650 hp. The heaviest comprise a 150-hp. motor for the 5-yd. clamshell unit on the dock; and two of 75-hp. each on the cone crusher and wash-water pump; and one of 50-hp. for the main elevator. A Wheeling 10 by 36-in. jaw crusher, driven by a 40-hp. motor, serves for reducing the grizzly oversize at the head of the mill. Other oversize rock, discharged from the rotary screens, is reduced by the Symons crusher.

Water for Classifiers

The water for the screens and other classifiers, amounting to 1200 g.p.m., is supplied by a Byron Jackson 10-in. centrifugal, deep-well pump. The water line consists of a 10-in. pipe below the dock, this being reduced to 8 in. from that level to the head of the rotary screen. The water is raised to a height of 86 ft.

Building of Heavy Mill Construction

The plant, of heavy mill construction, required a substantial foundation for which 350 wooden piles, 80 to 100 ft. long, were driven. Evan T. Phillips, assisted by George Post, prepared the plans and supervised the construction.

Sand and Gravel Specifications

Producers of aggregates for Bonneville work are guided by the following specifications for grades of sand: Passing ⅜-in., 100%; retained on No. 4 screen, 95 to 100%; retained on No. 16, 35 to 75%; retained on No. 50, 10 to 25%; retained on No. 100, 0 to 7%. These apply to both Willamette and Columbia river sand. The grades specified for coarse aggregates are ¼ to ¾-in., ¾ to 1½-in., and 1½ to 3-in.

The transportation of aggregates to the dam site is handled by the Union Pacific railroad, using gondola 40-yd. cars and running 60-car trains. The haulage distance is 42 miles. The first shipment of this kind was made October 14, 1934.

Public Works Outlook

Washington, D. C.: At this writing, March 29, the President's $4,880,000,000 public works bill seems assured of passage by Congress. PWA is said to have a list of almost twice that amount which has been reported by states and local authorities as an inventory of available construction work. The President, according to his secretaries, is to be chairman of what is to be known as the Allotment Committee. Among the members will be Harry Hopkins, Harold L. Ickes and Admiral Christian J. Peoples, head of the procurement division of the treasury department, a long time personal friend of the President. It was Admiral Peoples who told the senate appropriations committee that one of the work relief projects in view involves the establishment of government filling stations along highways to sell gas to motorists. This committee, with a vast staff at its command, will sift out the appeals, proposals and schemes for the spending of the 5 billions and put the final decisions on allotments up to the President.

The allotment committee will be assisted by an advisory committee of business men, the functions of which will be to endeavor to keep the allotment committee anchored to practicalities and to make the work relief undertaking palatable to business. Gen. Robert E. Wood of Chicago, head of Sears, Roebuck & Co., is to be chairman of the advisory committee. Secretary of Commerce Roper announced two other members: Robert G. Elbert, New York manufacturer, and A. R. Glancy of Detroit, vice president of General Motors. Undersecretary of Agriculture Rexford Guy Tugwell also will have an important role in the organization. He will have jurisdiction of all land utilization and conservation projects involving the expenditure of nearly a billion dollars of the huge work relief fund.

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Washington, D. C.: The U. S. Supreme Court decision on March 4 bars the State of Tennessee from specifically taxing the Nashville, Chattanooga & St. Louis Railway to meet half the cost of grade crossing eliminations, and actually implies that neither the state nor the federal government can directly discriminate against the railroads by special assessments for this purpose, and that if revenues are needed general taxation must be applied to all classes.

In the opinion of the high court, Justice Brandeis pointed out that the grade crossing elimination projects were being undertaken for unemployment relief purposes, as well as for the furtherance of "uninterrupted, rapid movement by motor vehicles." The court pointed out that while the railway, the sufferer from construction of the highway, is burdened with half the cost of the underpass, as proposed by the state order, the owners of trucks and buses and others who are beneficiaries of its construction, are immune from making any direct contribution toward the cost.

The decision, it is generally believed, will expedite grade crossing eliminations, which otherwise the railways could have long delayed by legal opposition.

Portland Cement Pavement

AWARDS of concrete pavement for February, 1935, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded during Feb., 1935	Total Sq. yd. for year to date, Mar. 2, 1935
Roads	1,683,472	4,039,048
Streets	640,480	1,552,402
Alleys	7,375	11,210
	2,331,327	5,602,660

Rock Products News Briefs

Basing Point Price System Under Fire

REPORTS to President Roosevelt on the price-basing methods of the steel industry, if they result in administrative or legislative action, will sooner or later have their effect on the portland cement, lime and other rock products industries which follow the same method.

The Federal Trade Commission, in its report, makes the outright recommendation that what it calls code provisions giving executive sanction to the multiple basing point system be eliminated. It thereby proposes that the system be made open to legal attack on the ground that it violates the anti-trust laws. It points out that if the system be eliminated from the code it would, of course, be excluded from protection under the National Industrial Recovery Act provision exempting those complying with the code from anti-trust action.

In summarizing, the FTC report states that there is no substitute for price competition (which it claims does not exist under the Steel Industry's code) as a regulator of prices, and says that inefficiency is fostered by price fixing (which it claims exists at present). It is also stated that numerous economic studies show that the moderate sized plant has as low, and often lower, unit costs than the predominant interests in a given industry, and yet is protected against "the unfair employment of the great resources of huge competitors."

The NRA shows a better understanding of industry and is more sympathetic in its report, which recommends a group mill price base system, which is described as follows: "Group mill bases shall be established as follows: (*a*) within 50 miles of each town at any time containing a total capacity for producing 20,000 tons per year or more of iron and steel ingots and also containing facilities for rolling or otherwise shaping such ingots into blooms, billets, slabs, sheet bars or other primary or semi-finished forms. It would be required that there be a group mill base for which base prices shall be filed for each product produced at any plant located nearer thereto in terms of all-freight than to any other group mill base; (*b*) all existing basing points other than those which may be designated as group-mill bases in above shall become group-mill bases for which base prices shall be filed for any product now based at such points which is produced at any plant located nearer thereto in terms of all-freight than to any other group-mill base."

The report said that the plan would necessitate the establishment of 19 entirely new group-mill bases and the expansion to include additional products of 10 existing basing points for such products. This method, the report pointed out, would leave only approximately 1¾% of rolling mill capacity more than 50 miles from a group-mill base. The freight charges would be approximately actual freight rather than arbitrary freight from distant competing points.

The report shows a grasp of industry's problems in the following extracts:

"(1) We have seen that not all the criticisms of the basing point system are justified in the terms in which they are made. But we have seen that it does not tend to be as serviceable a form of competition as a system in which there is more incentive for a producer to lower his base price as a means of extending his sales area, rather than doing this by merely absorbing freights and discriminating. We have seen that there are wastes of competitive cross-hauling, which must ultimately be charged to the consumers, and that certain purchasers are burdened with artificial freights. Piece-meal change will not avoid the existing hostility which, whether fully justified or not, is attached to the principle of artificial freights which characterizes the basing point system. This hostility may be avoided if such changes as are made are parts of a comprehensive program having as its goal the establishment of a system based upon a different principle.

"(2) We have seen that a change to f.o.b. mill selling would be too uncertain and disturbing in its effects to be seriously considered at this time, or at any time without exhaustive preliminary inquiries. We have seen that a mill-base system will not remedy the principal objections mentioned above unless it is combined with the abolition of freight absorptions (which is inadvisable) or their limitation. And we have seen that neither of these things can, in all probability, be accomplished by Federal compulsion, but only by such coöperative effect as can go on under the code form of organization. We have also seen that a mill base for every single mill would add unnecessary complications and yield no substantial advantage as compared to a group mill-base system. We have seen that the principle of actual rather than artificial freight is sound and desirable, but not necessarily to the extent of requiring the removal of the minutest discrepancies between them, but only discrepancies which are sufficiently substantial to be an important and characteristic feature of the system. It is sufficient if the characteristic feature of the system is the basing of prices on approximate freight, disregarding minor differences. A system of this character is better described as a group-mill-base system than as a modified basing point system."

The report rejects the proposal for an f.o.b. mill base system, whose disturbing features are listed. Likewise it expresses the view that compulsory adoption of such a system, which would call for positive legislation, would be of extremely questionable constitutionality.

Iron and Steel Institute Defends Basing Point System

The Iron and Steel Institute has issued an explanation and defense of the basing point price system, which should be read and absorbed by all the rock products industries, in which this conclusion is drawn: "The basing point method of quoting prices as now practiced in the steel industry tends definitely to discourage quoting too high a price at any basing point because the higher the price at a given basing point the greater the inducement for mills located remote from that basing point to invade that market to compete for a share of whatever business may be offered, without having to face too much absorption of freight charges in order so to compete. For that reason it may be said that although the basing point method may tend to create uniformity of prices for any product at any place of delivery, it nevertheless has a strong tendency to determine any such uniformity of prices at a comparatively low level. Any other method of quoting prices, on the other hand, would tend in exactly the opposite direction to encourage sharp differences in prices in different sections of the country and, in general, prices always as high as would be consistent with monopoly of local markets."

What Will Happen When Buying Starts?

IT would take 4,000,000 workmen two years to produce the $18,574,000,000 pent-up demand for machinery accumulated since 1929, the Machinery and Allied Products Institute announced recently on conclusion of a nation-wide survey, which showed:

(1) A pent-up demand for machinery, accumulated during the depression years since 1929, amounting to an indicated total of $18,574,000,000.

(2) Prospective payroll to labor employed in the manufacture of these machinery requirements amounting to approximately $12,073,600,000.

(3) A prospective total of 20,123,000,000 man hours of labor in producing machinery required to meet the accumulated requirements.

(4) Potential employment for two years of a force equal to 4,000,000 workmen—more than four times the present number of workmen in the machinery industries—in the prduction of machinery needed to meet the accumulated demand.

The machinery industry itself is not equipped to handle this huge demand in the time set forth. The industry in 1929 employed 1,100,000 workers. "Naturally," the survey said, "it would be a physical impossibility for them to expand their facilities to employ the 4,000,000 workers needed to meet machinery requirements over a two-year period." Hence the Institute warned manufacturers to enter the market at once for their plant equipment requirements for rehabilitation.

Employment in the Sand and Gravel Industry

By H. H. Hughes, M. Allan and M. Schauble,
U. S. Bureau of Mines, Washington, D. C.

FEW DATA on employment in the sand and gravel industry have ever been collected. The Census of Mines and Quarries for 1929 reported 15,994 wage earners employed in 957 enterprises operating 1165 plants, and accounting for production of 168,885,667 short tons of sand and gravel. The canvass of the Census of Mines and Quarries excluded enterprises producing less than 25,000 tons during the year; operations of States, counties, municipalities, railroads, and public utilities; and plants engaged in the production of glass or molding sands.

In the canvass for 1933 the Bureau of Mines for the first time asked sand and gravel producers to report data on employment. Three questions were included on the schedule: Average number of men employed during the year, number of days the plant was operated, and length of the working day. Returns were received from companies accounting for 71.4% of the commercial production.

Data summarized in the accompanying table cover only those plants for which returns were received; no estimates for missing companies have been included. The table is set up by regions as established in the Code of Fair Competition. The average number of men employed, total man-shifts, and total man-hours have been calculated from data reported on the schedules. From these totals the average number of days in operation and the average number of man-hours per man per day have been computed for each region and for the United States. The quantity of sand and gravel produced at plants included in the study is shown in the table, as well as the percentage of total commercial production represented. Finally, computations have been made to show the average output of sand and gravel per man-shift and per man-hour.

A total of 12,536 men are represented in the study which includes 71.4% of commercial production. Assuming that production at the rest of the commercial plants was at approximately the same rate, it follows that about 17,500 men were employed by the sand and gravel industry during the year. The average number of days of employment throughout the year, however, amounted to only 155. The average shift was 8.7 hours.

Outputs per Man-Hour

The output of sand and gravel per man-hour ranged from 1.6 tons in Region 4 and 1.7 tons in Region 7 to 3.9 tons in Region 12 and 4.5 tons in Region 10. The figure of 18.2 tons per man-hour for Region 14 is not comparable to other regions because it is weighted heavily by the highly mechanized sand and gravel operations at Boulder Dam.

The apparent total of employment in 1933 was higher than that reported by the census for 1929. These figures, however, are not strictly comparable. Furthermore, the average number of days of operation in 1929, although not definitely stated in the census report, must have been at least 250 according to data given in a table showing a summary of enterprises classified according to number of days in operation. In addition, the average shift in 1929 in all probability was at least 10 hours. Actual man-hours of employment in the sand and gravel industry in 1929 probably exceeded 40 million, whereas total man-hours of employment in 1933 apparently were only about 23 million. These figures are approximations only but they indicate a reduction of nearly 50% in man-hours of employment in the sand and gravel industry from 1929 to 1933. Commercial production dropped more than 60% during this period.

Diversification of Products

Sand and gravel and crushed stone operations range in size and activity from the small portable plant producing unprepared road gravel to the completely-integrated commercial plant producing a wide variety of products. The diversification of products of plants reporting to the Bureau of Mines is summarized in the accompanying tables.

The first table shows the approximate number of plants, or in a few instances companies operating more than one plant, reporting production of various kinds of sand and gravel and stone in 1933. For example, the table shows that 37 plants reported production of glass sand and 1025 plants reported building sand. Of course there are many duplications because numerous plants report several products. A total of 1938 sand and gravel operations are in the table, exclusive of duplications. The stone table shows that 1335 plants report crushed stone for concrete and road metal. Likewise, 240 reported railroad ballast, but only 11 reported stone for use in alkali works.

The other table shows a frequency distribution of sand and gravel and stone plants according to the number of products reported in 1933. For example, 655 sand and gravel plants, representing 33.8% of the total operations included in the study, reported production of only one product. Six hundred and ten plants reported two products, and one plant reported 11 different products. Similar data are shown for stone; 1070 plants, representing 65.3% of the total, reported only one product, which, of course, was crushed

EMPLOYMENT IN THE COMMERCIAL SAND AND GRAVEL INDUSTRY, SAND AND GRAVEL PRODUCED AT PLANTS INCLUDED IN THE STUDY, AND AVERAGE OUTPUT PER MAN IN THE UNITED STATES, 1933, BY REGIONS[1]

Region	Employment					Production			
	Time employed			Man-hours				Average per man, short tons	
	Average number of men	Average number of days	Total man-shifts	Average per man per day	Total	Commercial sand and gravel, short tons	Per cent of total commercial	Per shift	Per hour
1. Maine, New Hampshire, Vermont, Rhode Island, Massachusetts, and Connecticut	444	119	52,700	8.5	445,885	1,368,647	62.4	26.0	3.1
2. New York	924	148	136,976	8.4	1,152,555	3,269,825	51.8	23.9	2.8
3. Pennsylvania, New Jersey, and Delaware	1,662	173	287,861	9.1	2,610,856	5,138,909	78.6	17.9	2.0
4. West Virginia, Virginia, Maryland, and District of Columbia	834	269	224,481	8.4	1,880,521	3,001,665	71.3	13.4	1.6
5. South Carolina, Georgia, Alabama, Florida, and Mississippi	398	131	52,056	9.0	468,085	1,356,564	60.3	26.1	2.9
6. North Carolina, Kentucky, and Tennessee	488	149	72,650	8.6	626,044	1,417,047	65.9	19.5	2.3
7. Arkansas, Louisiana, and Texas	1,447	178	257,780	9.0	2,316,410	3,956,350	77.6	15.3	1.7
8. Ohio	1,049	167	175,326	8.5	1,495,915	3,025,132	84.0	17.3	2.0
9. Illinois and Indiana	1,498	152	228,353	9.3	2,120,751	7,694,970	86.0	33.7	3.6
10. Michigan and Wisconsin	955	108	102,885	9.3	952,461	4,239,434	86.2	41.2	4.5
11. North Dakota, South Dakota, and Minnesota	470	68	31,893	8.4	266,897	934,073	63.3	29.3	3.5
12. Nebraska and Iowa	609	121	73,527	8.1	593,810	2,317,021	78.0	31.5	3.9
13. Kansas, Missouri, and Oklahoma	909	147	133,666	8.1	1,076,263	3,579,755	84.6	26.8	3.3
14. Wyoming, Colorado, New Mexico, Utah, and Arizona	153	168	25,632	8.1	206,430	3,751,107	91.7	146.3	18.2
15. California and Nevada	308	159	48,998	8.0	391,666	1,220,148	24.5	24.9	3.1
16. Montana, Washington, Oregon and Idaho	388	109	42,441	7.9	333,313	944,476	44.4	22.3	2.8
Total United States	12,536	155	1,947,225	8.7	16,937,862	47,215,123	71.4	24.2	2.8

[1]Does not include plants operated by or directly for States, counties, municipalities, and other government agencies.

stone. Ten plants reported seven products, but none reported more than seven.

APPROXIMATE NUMBER OF PLANTS (OR COMPANIES) REPORTING PRODUCTION OF SAND AND GRAVEL, AND STONE IN 1933, BY USES

Material produced	Number of companies (or plants)
Sand:	
Glass	37
Molding	215
Building	1025
Paving	810
Grinding and polishing	60
Fire or furnace	37
Engine	220
Filter	23
Railroad ballast	42
Other	175
Gravel:	
Building	800
Paving	890
Railroad ballast	185
Other	130
Total sand and gravel operations, excluding duplications	1938
Stone:	
Crushed stone (concrete and road metal)	1335
Railroad ballast	240
Riprap	240
Flux	130
Sugar	40
Glass	20
Paper	25
Agriculture	325
Alkali	11
Other	250
Total stone operations, excluding duplications	1640

FREQUENCY DISTRIBUTION OF SAND AND GRAVEL, AND STONE PLANTS (OR COMPANIES) ACCORDING TO THE NUMBER OF PRODUCTS REPORTED, 1933

Number of products	Sand and gravel	Per cent of total	Stone	Per cent of total
1	655	33.8	1070	65.3
2	610	31.5	335	20.4
3	240	12.4	145	8.9
4	260	13.4	50	3.0
5	85	4.4	20	1.2
6	60	3.1	10	.6
7	20	1.0	10	.6
8	4	.2	...	...
9	2	.1	...	...
10	1	.05	...	...
11	1	.05	...	...
Total operations	1938	100.0	1640	100.0

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Asbestos

Virginia City, Mont.: Work on commercial production of asbestos from the Karst Lodge mining claim in the Gallatin canyon is expected to start before long as the result of the leasing of the property of Peter F. Karst and Lla C. Laws. The lease provides that the work start within 30 days and provides that the lease may be voided whenever the work is halted for that period or longer. Mr. Karst is to receive a royalty of $4 a ton on all milled asbestos produced in the mine.

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Cement

Universal Atlas Cement Co. (subsidiary of the U. S. Steel Corp.) shipped 7,825,363 bbl. in 1934, as compared with 6,726,598 bbl. in 1933, an increase of 16.3%. It exported 146,294 bbl. in 1934, against 89,356 bbl. in 1933, an increase of 63.7%. The annual report of the U. S. Steel Corp. does not give any other details in regard to its cement business.

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Imports: The *Wall Street Journal* (New York City) states: "The improved feeling that has been noticeable in the portland cement industry over the past year received somewhat of a setback with announcement of the reciprocal trade agreement with Belgium whereby the tariff on cement imports from that country is reduced 25%. Although expressing no great concern that Belgium will currently attempt to send large shipments because of the restricted consumption here, the trade is fearful that the lower duty may encourage heavy imports on any future sustained upturn in demand. The only immediate effect foreseen is a possible slowing down in the placement of orders by dealers in the hope that a reduction in price may materialize. Manufacturers, however, see little likelihood of any material change in the price structure, at least in the immediate future. They point out that a high percentage of the current demand is coming from federally financed projects where certificates of NRA compliance are demanded, and that what sales are being made to privately financed construction are in small quantities and largely in the hands of their established dealers. Hence, they state, there is little incentive for Belgium producers to attempt to land large quantities in this market. The present cement tariff of 6c a 100 lb., or 23c per bbl. of 380 lb., was put into effect during the summer of 1930. Under the Belgium agreement imports from that country will now pay 4½c per 100 lb.

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Santa Cruz Portland Cement Co., San Francisco, Calif., recently opened officially its new distributing plant at Long Beach, Calif., with a party to which some 2000 invitations were issued. Officials of the company present from the San Francisco headquarters are George R. Gay, executive vice-president and general manager; Frank C. Languth, engineer in charge of construction of distributing plants; William H. Johnston, chief mechanic; R. A. Kinzie, Jr., chemist. John Kipp is superintendent of the Long Beach plant. J. Paul Cook, district sales manager for the harbor area, was master of ceremonies. Paul C. Graham, president of Graham Brothers, was present as representative of thee Santa Cruz company for Southern California and Arizona.

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International Cement Corp., New York City, was written up in the March issue of *Fortune,* in that magazine's usual elaborate style. The article is helpful to the entire industry in explaining in popular style the reason for uniform prices, and stresses the fact that the profits of the industry have been exceedingly small, notwithstanding its great investment. There is considerable about Mr. Secretary of the Interior Ickes which Mr. Ickes will not enjoy reading; and since Mr. Ickes is in a position to retaliate further, this part may not be such good publicity for the cement industry, although undoubtedly cement manufacturers will enjoy a temporary satisfaction.

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Three Forks Portland Cement Co., Trident, Mont., has resumed operations to fill a contract for the Fort Peck dam, after a shutdown of several months.

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Universal Atlas Cement Co., Leeds, Ala., according to local newspaper reports, contemplates spending $200,000 on rehabilitation; but inquiry at Chicago, Ill., the home office, shows that the local newspapers did not make clear that this was only a possibility, contingent on the city of Leeds getting a $500,000 construction program from PWA under the new public works bill.

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National Portland Cement Co., Brodhead, Penn. (near Bath) officially placed in production its new mill on March 15. Fred B. Franks, Sr., vice-president and general manager, broke a bottle of champagne over the kiln while it was rotating and conferred upon it the name of "Florence." The kiln, one of two, is one of the largest in operation in this country. Hugh Larkin, assistant vice-president, was master of ceremonies at a dinner party the same evening. With Mr. Franks, those who spoke are T. Stig-Nielson, New York, director; William M. Richardson, Philadelphia, president, and George M. Richardson, Philadelphia, secretary. Others who attended the dinner are John O. Shibe of Philadelphia, treasurer; Carl Grimmelman, New York, sales manager; A. P. Hachtmann, chief engineer; Harold Hardvendel, plant superintendent; Evan B. Guth, chief chemist; Fred B. Franks, Jr., Harry Crowder, Jr., Orla Larsen, J. Oscar Hundevad, Thord Offrell, Edward Smart, chief electrician; W. B. Dungan, manager of the Wellsburg, W. Va., plant of Arkell & Smiths.

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California: Marking methods covering the net contents of sacks of cement have been changed to require cement sacks to show the net contents in pounds and not cubic measurement, by C. E. Tucker, chief of the division of weights and measures. The weight tolerance will be subject to 2% variation plus or minus. Under the system of marking the sacks by the cubic foot it has been difficult to compute readily the volume of cement in terms of pounds, variations sometimes running as high as 30%, it is claimed.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

Lime Handling System Plant of Warner Co., Cedar Hollow, Penn.

THE HANDLING of burned lime is considerable of a problem to the lime manufacturer; and efficient handling results in improvement in several distinct directions. Proper handling has a bearing on quality of lime, on labor efficiency of the plant, on capacity of the kiln, and upon fuel efficiency.

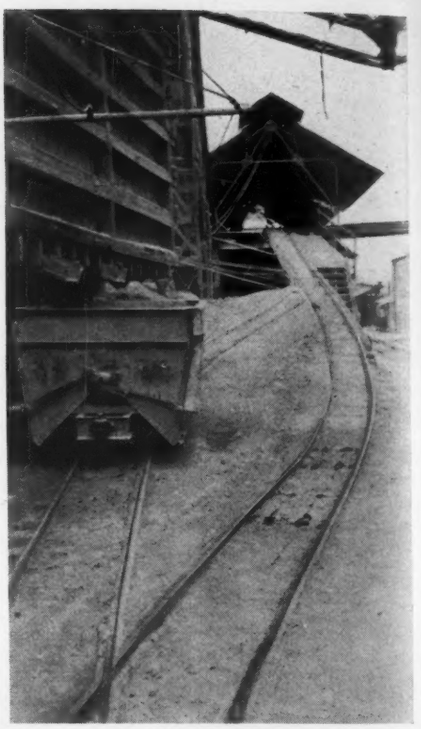
Of the four factors, lime quality is the least affected. If lime is improperly handled, there may be considerable breakage of the lumps, or if the draws are of too long duration, there may be sufficient cooling of the kiln to cause reabsorption of CO_2 gas, thus affecting the final product.

The labor item is far more important, and therefore the kiln outlet should be so designed that lime will flow out freely without excessive punching. In many plants the lime is drawn into large wheelbarrows, requiring far more time than when drawn into larger buggies. This, however, commonly is due to the low cooler, and so necessary absence of draw hoppers.

When direct fired kilns are used, during the draw period there is ordinarily a complete interruption in firing, and therefore naturally the kiln capacity is reduced. Lime is made only when fuel is burned, and the longer the time necessary to draw, the less lime will be made.

Also, when drawing, large amounts of air enter the kiln, cooling the lime. Later this heat has to be regained before the normal rate of calcination is resumed.

Also, it is better to draw kilns oftener—every four or three, or, in special cases, even every two hours. Frequent drawing results in more uniformly burned lime; also then the



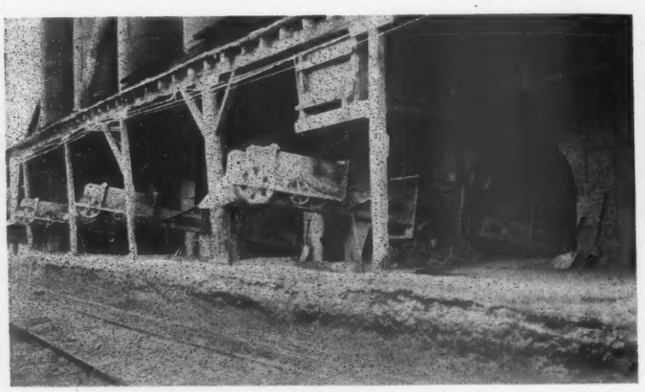




Fig. 1 (Left); Fig. 2 (Above); Fig. 4 (Right)



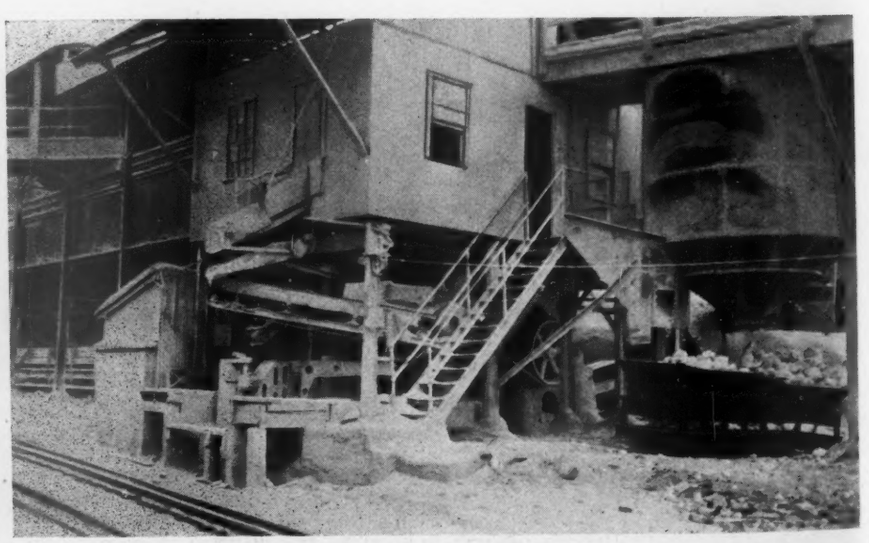


Fig. 3 (Left); Fig. 6 (Above)

Details of the lime handling equipment of the Cedar Hollow plant of the Warner Co.

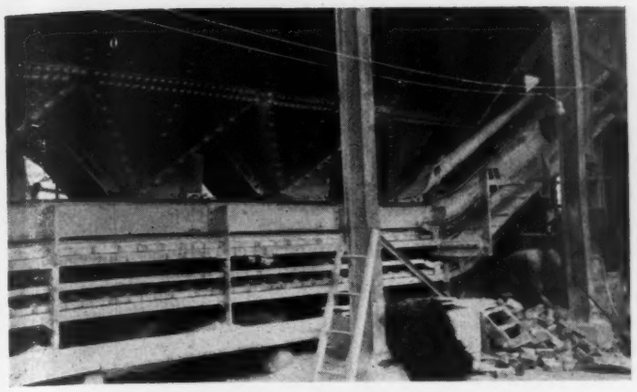


Fig. 5 — Picking conveyor at Warner Co.'s Cedar Hollow lime plant

kiln is less likely to become excessively hot at localized points; and so the lining lasts longer. When drawing is inconvenient and requires much time, to draw often is impracticable. The kiln would be out of service too much; so, in many cases the kilns are drawn every six, and even at as long intervals as eight hours. It is only natural that when a completely burned piece of lime lies in front of a furnace eye for a six-hour period, it will be overburned.

At the plant of the Warner Co., there is no so-called "lime floor"; no lime is dumped on the floor; all the lime is taken in cars directly to a special bin. Some of the kilns are high, so the cars can be loaded from hoppers, as at Marblehead and at St. Genevieve. However, there are still some kilns of old design. In these cases, each kiln was equipped with a conveyor, as shown in Fig. 1. This conveyor conveys the lime to the car located on a track and moved by an electric trolley locomotive.

The time necessary to draw under these conditions is much shorter, even though not so short as when the kiln is equipped with hoppers.

Fig. 2 shows the type of car used. It will be noted that it is of the side-dump type. This figure also shows the incline leading to the shed containing the lump lime bin.

Fig. 3 shows the upper part of the lime bin with track and roof. It is important that lump lime does not fall to a great depth, otherwise there will be considerable breakage of lumps. Therefore, these bins have an unusual design. They are long and shallow and, so of necessity, contain many outlets. When a car of lime is emptied, care is taken that it always is in such a position that the lumps have the least distance to fall or roll. Segregation of coarse from fine in such a bin is also at a minimum.

Fig. 4 shows the lower portion of the lime with the ten outlet gates and the conveyor located underneath.

In Fig. 5 the extreme end of the bin is shown where the conveyor inclines upward. It is at this point that the lime is picked for considerable material, and lumps containing core are broken. This is done when the conveyor is in motion.

Fig. 6 shows the building in which the screen is located, separating the lump lime from the fines. Lump lime is loaded into railroad cars by the car loader shown in the picture, while the fines are taken to the hydrator. At this point, the core also is collected in kiln charging cars to be returned either to the kiln or discarded, depending upon its size.

While at this plant there are eighteen kilns, some very large and different units much scattered, all lime from all except the rotary kiln is brought to this one point. All the drawing is done by a special man, who moves successively from kiln to kiln. The fireman only punches the kiln and tells the draw man how much and when to draw.

Lime

Elliston Lime Co., Deer Lodge, Mont., has resumed operation, after a two-months' shutdown. A new rock storage 12x12x34 ft. has just been completed at the company's mine.

◈ ◈ ◈

National Gypsum Co., Buffalo, N. Y., has resumed operation of its lime plant at Luckey, Ohio, after a shutdown since January 1.

◈ ◈ ◈

Ohio: A special ruling of the state sales tax authority exempts lime which is used for agricultural purposes from the tax. Feed, seed and fertilizer are also exempt.

◈ ◈ ◈

Statistics: Trade Relations Committee of the National Lime Association has compiled statistics of shipments for the last quarter of 1934 as follows:

SHIPMENTS AND CAPACITY[1]

Month	Total capacity represented, short tons	Total shipments reported, short tons	Average value per ton	Ratio Shipments to Capacity, Per Cent — Lime Manufacturing Districts — United States	1	2	3	4	5B	6–8–9	7	10–11	12	13	14	15
1934—																
October	407,803	135,667	$7.71	33.3	21.0	32.4	36.4	50.7	26.7	26.7	45.3	37.4	24.9	20.7	27.8	24.1
November	404,887	119,561	7.61	29.5	16.4	25.7	32.0	41.8	28.3	23.1	42.5	37.4	22.2	18.0	23.0	21.1
December	404,970	109,247	7.25	26.9	14.5	20.7	34.7	35.2	26.5	21.1	39.2	33.9	14.9	11.4	24.5	16.9

[1]All data relate only to competitive lime. Total capacity includes the following capacity reported as idle: October, 8,790 tons; November, 11,016 tons; December, 11,026 tons.

National Lime Association members of a few years back who remember Dr. R. T. Haslam, of Massachusetts Institute of Technology, for his research work on lime, will be interested to know that he is now general sales manager of the domestic marketing affiliates of the Standard Oil Co. (N. J.). He will supervise wholesale, retail and tank car sales of the four companies comprising the Esso Marketers. These are the Standard Oil Companies of New Jersey, Pennsylvania and Louisiana and the Colonial Beacon Oil Co. Joining Standard Oil Co. of New Jersey in 1927, Mr. Haslam later became a director of the Standard Oil Development Co., of which he subsequently became general manager and vice-president. In 1933, as senior vice-president, he also took charge of the lubrication sales department of the Esso Marketers. In his new position he remains as vice-president and executive committee member of the development company.

◈ ◈ ◈

Washington-Idaho Lime Products Co., Orofino, Idaho, started operation the last of February, after a considerable shutdown. Only one kiln is under fire at present.

◈ ◈ ◈

Sand-Lime Brick Production and Shipments in February, 1935

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Eight sand-lime brick plants reported for the month of February, this number being two more than the number reporting for the month of January, statistics for which were published in March.

Average Prices for February

Shipping point	Plant price	Delivered
Hartford, Conn.	$17.00	.....
Pontiac, Mich.	9.50	$12.00
Mishawaka, Ind.	9.25	.....
Syracuse, N. Y.	14.00–16.00	16.00–20.00
Saginaw, Mich.	10.50	.....
Toronto, Ont., Can.	12.00	13.50

Statistics for January and February

	January†	February*
Production	175,000	154,825
Shipments (rail)	.....	13,000
Shipments (truck)	349,562	266,105
Stocks on hand	1,317,019	1,363,426
Unfilled orders	100,000	100,000

†Six plants reporting; incomplete, three not reporting unfilled orders.

*Eight plants reporting; incomplete, three not reporting unfilled orders.

The Sioux Falls Pressed Brick Co., Sioux Falls, S. D., reports that it expects to resume operations in April.

Giant Portland Cement Co. Tries New Safety Explosive

A QUARRY SHOT which marks the last word in safety and certainly is completely new as far as the explosives industry is concerned, according to the experts of the E. I. du Pont de Nemours & Co., took place at the Giant Portland Cement Co.'s quarry at Egypt, Penn., on March 6.

The first phase of the shot from a safety angle which will be of interest to all quarry men consisted in loading two of the holes with "Nitramon," the new du Pont safety blasting agent, and detonating them with a can of TNT, to which was attached cordeau. The blasting cap was placed on the end of the cordeau about 300 ft. away.

The significance of the blasting of these two holes lies in the fact that every phase of the explosives operation was carried out with the least sensitive blasting agents known to man, with the exception, of course, of the blasting cap which was 300 ft. away.

The results of the shot were excellent both from the view of quarry operators and from that of explosives men. Explosives experts regarded the shooting of these two holes as a revolutionary performance, in view of the nature of the agents employed.

Other holes at the quarry were detonated by means of a dynamite cartridge used on top of the "Nitramon." About 11,000 lb. of "Nitramon" were used in the entire operation, producing about 55,000 tons of well broken stone, and at a very substantial saving in cost over what would have been incurred had the regular dynamite been employed.

It would have been possible in a shot like this, if anything had gone wrong, to have simply removed the TNT and dug out the "Nitramon" in perfect safety.

Cement Products

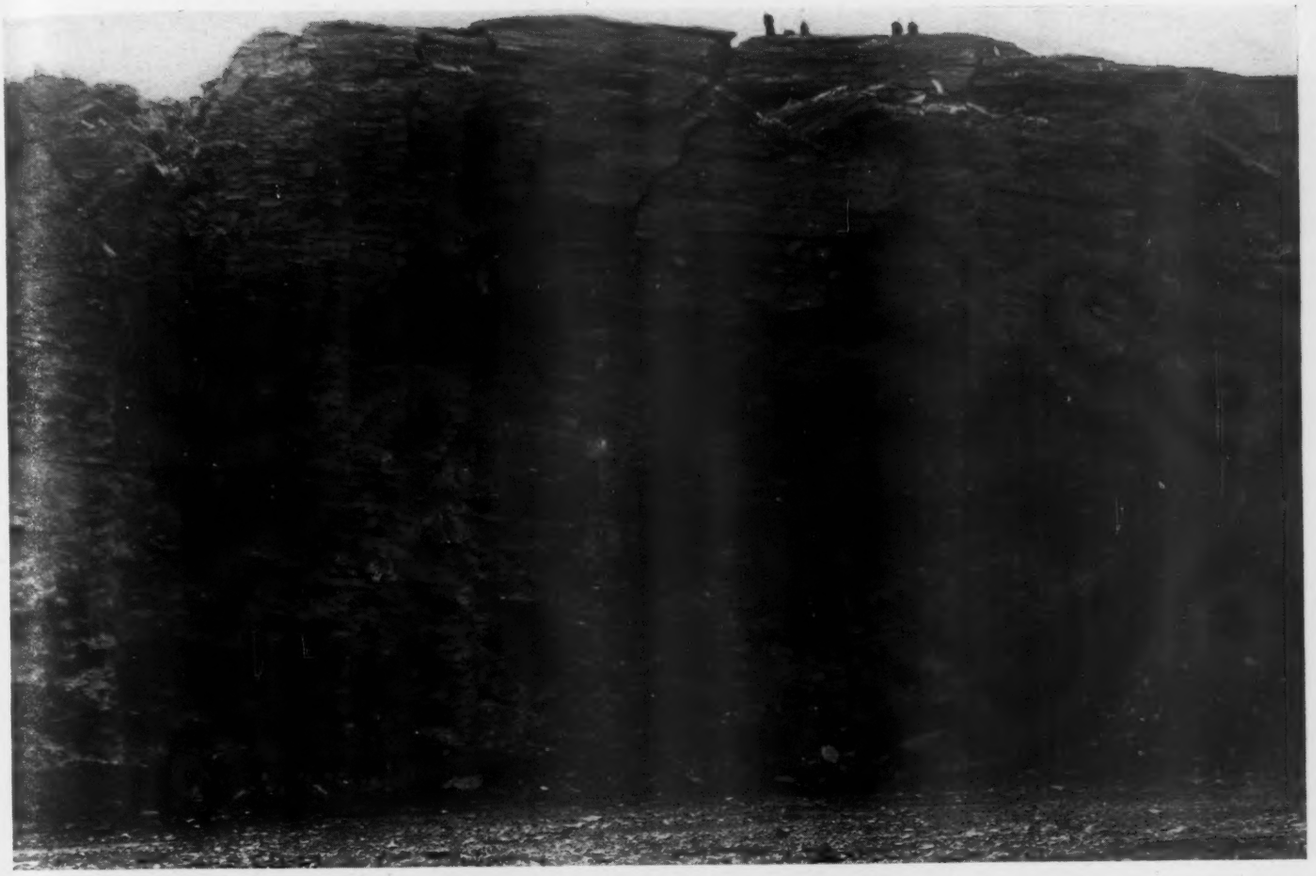
Green Bay Planing Mill Co., Green Bay, Wis., has erected at Haevers Corners on the Cedar Creek road a plant for the manufacture of concrete blocks. In the new plant all the necessary new equipment has been erected, tests made and a high quality product achieved. The plant will be equipped to include in its regular output concrete blocks for building purposes in various sizes and in plain face, panel face, smooth face and rock face finishes. The product will be used in basement construction, warehouses, garages and other building purposes. The plant will be a division of the Green Bay Planing Mill Co. In announcing that the new plant was well on its way and in production, O. W. Brightman, president of the company, said: "The increase in residence construction and the confidence that this now will continue quite uninterrupted made it seem wise to our company that we add to our already extensive lines of building materials, concrete blocks of our own manufacture. Our patrons can be assured that these blocks will be of a high quality which this company will at all times back up and be proud to call its own."

◈ ◈ ◈

Topographic Map of Alton, Ill., and Vicinity. A map of the Alton quadrangle comprising an area of 232 square miles, recently published by the United States Geological Survey, Department of the Interior, price 10c. This area has extensive resources of limestone, coal and fire clay, which have aided in the development of the area.



Loading blast holes at Egypt, Penn., quarry of the Giant Portland Cement Co. with new, safe, high explosive



Quarry face before and after experimental blast



RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	3-20-35	3	5	
Allentown P. C., pfd.[47]	3-20-35	4	6	
Alpha P. C., com.	3-21-35	14	16	.25 April 25
Amalgamated Phos. 6's, 1936[47]	3-20-35	100	102	
American Aggregates, com.[48]	3-14-35	¾	1¾	
American Aggregates, pfd.[48]	3-14-35	2	5	
American Aggregates, 6's 1st mtg. 3/6's, 1943 new bonds[48]	3-14-35	40	45	
American Aggregates, 6's 1943, old bonds[48]	3-14-35	45	50	
American L. & S., 1st 7's[48]	3-14-35	95	....	
Arundel Corp., com.	3-20-35	16¼	actual sale	.25(qu.) Apr. 1
Ashgrove L. & P. C., com.[49]	3-15-35	11	....	
Ashgrove L. & P. C., pfd.[49]	3-20-35	3	4	
Bessemer L. and C., Class A[47]	3-20-35	3	4	
Bessemer L. and C., 1st 6½'s, 1947[47]	3-14-35	30½	....	
Bessemer L. and C., cert. of dep., 1947[46]	3-14-35	30	35	
Bloomington Limestone, 6's[47]	3-20-35	8	12	
Boston S. and G., new com.[37]	3-14-35	1½	3	
Boston S. and G., new 7% pfd.[37]	3-14-35	5	7	
Boston S. and G., 7's, 1939[37]	3-14-35	65	75	
Calaveras Cement, com.[40]	3-13-35	⅞	1⅛	
Calaveras Cement, 7% pfd.[40]	3-13-35	31	35	
California Art Tile, A[9]	3-13-35	1 1/10	2	
California Art Tile, B[9]	3-13-35	....	1	
Canada Cement, com.[42]	3-14-35	6	6½	
Canada Cement, pfd.[42]	3-14-35	56	59	
Canada Cement, 5½'s, 1947[42]	3-14-35	102	103	
Canada Crushed Stone, bonds[42]	3-14-35	90	....	
Canada Crushed Stone, com[42]	3-14-35	10	....	
Certainteed Products, com.	3-21-35	4	4½	
Certainteed Products, pfd.	3-21-35	24	30	
Certainteed Products, 5½'s, 1948	3-21-35	68¾	actual sale	
Consol. Cement, 1st 6½'s, 1941[47]	3-20-35	32	34	
Consol. Cement, pfd.[47]	3-20-35	2	3	
Consol. Oka S. and G. (Can.), 6½'s[42]	3-14-35	....	23	
Consol. S. and G. com[42]	3-14-35	¼	....	
Consol S. and G. pfd.[42]	3-14-35	25	....	
Consol. Rock Prod., com.[47]	3-20-35	1	2	
Consol. Rock Prod., pfd.[47]	3-20-35	2	3	
Consol. Rock Prod., units[47]	3-20-35	3	5	
Construction Mat., com.[47]	3-20-35	1	2	
Construction Mat., pfd.[47]	3-20-35	2	3	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	3-20-35	20	25	
Coosa P. C., 1st 6's[47]	3-20-35	20	25	
Coplay Cement Mfg., pfd.[47]	3-20-35	10	15	
Coplay Cement Mfg., 6's, 1941[47]	3-20-35	60	70	
Cumberland P. C., 7's, 1937[47]	3-22-35	75	80	
Dewey P. C., com.[47]	3-20-35	24	28	
Dolese and Shepard	3-21-35	9	10	
Dufferin Pav. and Cr. Stone, com.[42]	3-14-35	....	2	
Dufferin Pav. and Cr. Stone, pfd.[42]	3-14-35	25	....	
Federal P. C., 6½'s, 1941[47]	3-20-35	23	28	
Fla. Port. Cement, 6½'s, 1937[46]	3-14-35	96½	98	
Florida Port. Cement, units[47]	3-20-35	19	21	
Giant P. C., com.[47]	3-20-35	2	4	
Giant P. C., pfd.[47]	3-20-35	13	17	
Gyp. Lime & Alabastine, Ltd.	3-16-35	5	5¾	
Gyp. Lime & Alabastine 5½'s, 1948[47]	3-20-35	85	90	
Hawkeye P. C., cap.[49]	3-15-35	30	....	
Hercules Cement, com.[49]	3-15-35	18	....	
Hercules Cement, 7% pfd.[49]	3-15-35	92	....	
Hermitage Cement, com.[47]	3-20-35	10	13	
Hermitage Cement, pfd.[47]	3-20-35	50	60	
Ideal Cement 5's, 1943[47]	3-20-35	100	102	
Ideal Cement, com.[47]	3-20-35	35	37	.50 (qu. & ex.) Apr. 1
Indiana Limestone 6's[47]	3-20-35	8	11	
International Cement bonds, 5's, 1948	3-21-35	99	actual sale	
International Cement, com.	3-21-35	24	24½	.25 March 29
Kelley Island L. and T.	3-21-35	8⅛	12	.15 (qu.) Apr. 1
Ky. Cons. Stone, 6½'s, 1938[47]	3-20-35	10	15	
Ky. Cons. Stone, com.[47]	3-20-35	1	2	
Ky. Cons. Stone, pfd.[47]	3-20-35	2	3	
Ky. Cons. Stone, 1st mtg. 6½'s[46]	3-14-35	12	15	
Ky. Rock Asphalt, com.	3-21-35	½	1	
Ky. Rock Asphalt, pfd.	3-21-35	3	8	
Ky. Rock Asphalt, 6½'s, 1935[47]	3-20-35	25	35	
Lawrence P. C[47]	3-22-35	14	16	
Lawrence P. C., 5½'s, 1942[47]	3-20-35	80	85	
Lehigh P. C., com.	3-21-35	11⅛	11¾	
Lehigh P. C., 7% pfd.	3-21-35	98	nominal	.87½ Apr. 1
Louisville Cement[47]	3-20-35	75	85	
Lyman-Richey 1st 6's, 1935[47]	3-20-35	25	30	
Marbelite Corp., com. (cement pts.)[40]	3-13-35	¼	½	
Marbelite Corp., pfd.[40]	3-13-35	4¼	....	
Marblehead Lime 6's, 1939[14]	3-13-35	40	45	
Marquette Cement, com.[47]	3-20-35	19	21	
Marquette Cement, pfd.[47]	3-20-35	85	90	
Marquette Cement Mfg. 1st 5's, 1936[47]	3-20-35	98	100	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Marquette Cement Mfg. 1st 6's, 1935[46]	3-14-35	100	110	
Material Service Corp.[47]	3-20-35	2	5	
McCrady-Rodgers, com.[47]	3-20-35	5	7	
McCrady-Rodgers, 7% pfd.[47]	3-20-35	20	25	
Medusa P. C., com.[47]	3-20-35	11	14	
Medusa P. C., pfd.[47]	3-20-35	35	40	
Michigan L. and C., com.[47]	3-20-35	65	70	
Missouri P. C.[49]	3-15-35	6¾	7¾	
Monarch Cement, com.[47]	3-20-35	75	85	
Monolith P. C., com.[9]	3-13-35	2½	3½	
Monolith P. C., 8% pfd.[9]	3-13-35	6¼	7¼	
Monolith P. C., units[9]	3-13-35	15	18	
Monolith P. C., 1st mtg. 6's[9]	3-13-35	99	101	
Monolith Portland, Midwest[9]	3-13-35	1	1½	
National Cement (Can.) 1st 7's[42]	3-14-35	99	....	
National Gypsum A., com.[47]	3-20-35	9	10	
National Gypsum, pfd.[47]	3-20-35	85	90	1.75 April 1
National Gypsum 6's[47]	3-20-35	101	103	
National L. and S. 6½'s, 1941[47]	3-20-35	93	96	
Nazareth Cement, com.[47]	3-20-35	4	6	
Nazareth Cement, pfd.[47]	3-20-35	30	35	
Newaygo P. C., 7% cum. pfd.[49]	3-15-35	27½	....	
Newaygo P. C., 1st 6½'s, 1941[46]	3-13-35	25	30	nominal
New England Lime 6's, '35[14]	3-13-35	9	10	
N. Y. Trap Rock 1st 6's, 1946	3-16-35	58½	60¼	
N. Y. Trap Rock, 7% pfd.[46]	3-14-35	60	....	
North Amer. Cement, 1st 6½'s, 1953[47]	3-20-35	20	22	
North Amer. Cement, 6½'s, 1943[47]	3-22-35	71	72½	
North Amer. Cement, 6½'s, 1940[47]	3-22-35	46	49	
North Amer. Cement, com.[47]	3-20-35	½	1	
North Amer. Cement, 7% pfd.[47]	3-20-35	1	2	
North Shore Mat. 1st 6's[47]	3-20-35	30	35	
Northwestern Port. Cem. units[47]	3-22-35	25	28	
Northwestern States P. C.[47]	3-20-35	25	28	
Ohio River S. and G., com.	2-21-35	....	8	
Ohio River S. and G., 1st pfd.	2-21-35	40	....	
Ohio River S. and G., 2nd pfd.	3-21-35	5	10	
Ohio River S. and G., 6's[46]	3-14-35	6	10	
Oregon P. C., com.[47]	3-20-35	2	4	
Oregon P. C., pfd.[47]	3-20-35	60	65	
Pacific Coast Agg., new com.[40]	3-13-35	1¼	1½	
Pacific Coast Cement, 6's, '37[40]	3-13-35	100½	....	
Pacific P. C., com.[40]	3-13-35	2½	3	
Pacific P. C., pfd.[40]	3-13-35	33	36	
Peerless Cement, com.[47]	3-20-35	½	1	
Peerless Cement, pfd.[47]	3-20-35	3	4	
Penn.-Dixie Cement, com.	3-15-35	3⅛	3½	
Penn.-Dixie Cement, pfd.	3-15-35	14	20	
Penn.-Dixie Cement, 6's A, 1941	3-15-35	71½	72⅛	
Penn. Glass Sand Corp., pfd.[47]	3-20-35	85	90	3.50 (qu. & arrears) April 1
Penn. Glass Sand Corp., 6's[47]	3-20-35	102	105	
Petoskey P. C., 6's, 1941[46]	3-20-35	70	....	
Petoskey P. C., 6's, 1935-38[46]	3-20-35	85	....	
Petoskey P. C., com.[46]	3-20-35	2½	....	
Republic P. C., 6's, 1943[47]	3-20-35	85	88	
Riverside Cement, A[9]	3-13-35	7½	9	
Riverside Cement, B[9]	3-13-35	¾	1	
Riverside Cement, pfd.[9]	3-16-35	90	95	
Rockland and Rockport Lime, 1st pfd.[47]	3-22-35	2	3	
Sandusky Cement 6½'s[47]	3-20-35	70	80	
Santa Cruz P. C., com.[9]	3-13-35	58	61	.50 (qu.) April 1
Schumacher Wallboard, com.[9]	3-13-35	½	1	
Schumacher Wallboard, pfd.[9]	3-13-35	1½	3	
Signal Mt. P. C., units[47]	3-20-35	22	25	
Southwestern P. C., units[40]	3-13-35	180	....	
Spokane P. C. 7% cum. pfd.[49]	3-15-35	8½	....	
Standard Paving & Mat. (Can.), com.[42]	3-14-35	90c	....	
Standard Paving & Mat. pfd.[42]	3-14-35	....	13	
Superior P. C., A[40]	3-13-35	33	35	.55 (2 mos) March 1
Superior P. C., B[40]	3-13-35	7	9	
Trinity P. C., units[47]	3-20-35	10	15	
U. S. Gypsum, com.	3-21-35	427⅞	actual sale	.25 April 1
U. S. Gypsum, pfd.	3-21-35	145½	actual sale	1.75 April 1
Volunteer P. C., 1st 7's, 1942[49]	3-15-35	65	....	
Volunteer P. C., com.[49]	3-15-35	1¾	....	
Vulcanite P. C., cap.[49]	3-15-35	1¾	3	
Vulcanite 7½'s, 1943[49]	3-15-35	40	....	
Wabash P. C.[47]	3-20-35	6	8	
Warner Co., ww. 1st 6's[47]	3-20-35	30	33	
Warner Co., com.[47]	3-22-35	1	2	
Warner Co., pfd.[47]	3-22-35	9	11	
Whitehall Cem. Mfg., com.[47]	3-20-35	25	30	
Whitehall Cem. Mfg., pfd.[47]	3-20-35	50	60	
Wisconsin L. & C., 1st 6's, '40[47]	3-20-35	40	50	
Wolverine P. C., com.[47]	3-20-35	1	2	
Yosemite P. C., A, com.[40]	3-13-35	1¼	1½	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14] The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbit, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

Recent Dividends Announced

Arundel Corp. (quar.)	$0.25	Apr. 1, '35
Ideal Cement Co. (quar. and extra)	.50	Apr. 1, '35
International Cement Corp.	.25	Mar. 29, '35
Kelley Island Lime & Transport Co. (quar.)	.15	Apr. 1, '35
National Gypsum Co., 7% pfd. (quar.)	1.75	Apr. 1, '35
Pennsylvania Glass Sand Corp., pfd. (quar. and arrears)	3.50	Apr. 1, '35
Santa Cruz Portland Cement Co., com. (quar.)	.50	Apr. 1, '35
Superior Portland Cement, Inc., Class A (arrears—for July and Aug., 1934)	.55	Mar. 1, '35
U. S. Gypsum, com. (quar.)	.25	Apr. 1, '35
U. S. Gypsum, pfd. (quar.)	1.75	Apr. 1, '35

Boston Sand and Gravel Co., Boston, Mass., reports for the year 1934, Paul P. Bird, president: "One year ago, we reported that the year 1933 had been very disappointing and had resulted in a loss. At that time, we said our business was improving, due to jobs provided for by federal appropriations, and that the company was looking forward to a considerable improvement in 1934. We are now able to report that 1934 has shown a distinct improvement over 1933. The company is in a good cash position and, month by month, we have slowly increased our working capital. We feel quite encouraged and believe that 1935 will show continued improvement."

Current assets as of December 1, 1934, were given as $308,199, of which $97,592 was cash and $24,346 marketable securities; current liabilities $29,535.

◆ ◆ ◆

Northwestern States Portland Cement Co., Mason City, Ia., reports a balance sheet as of November 30, 1934, showing current assets of $1,656,819, of which $1,427,453 was cash; and current liabilities of $255,066.

◆ ◆ ◆

Canada Cement Co., Ltd., Montreal, Que., reports for the years ending November 30:

INCOME ACCOUNT

	1934	1933
†Operating profit	$2,094,114	$1,486,740
Depreciation	1,000,000	250,000
Balance	1,094,114	1,236,740
Bond interest	1,002,194	*1,077,115
Extraordinary repairs, etc.	36,755	25,000
Contingent reserve	.....	57,711
Net income	55,165	76,914
Previous surplus	839,595	762,681
Prior year adjustment	(cr)50,535	.....
Surplus, November 30	945,295	839,595
Times interest earned	1.09	1.15
Times preferred dividends earned	0.04	0.06

*Includes $48,979 premium on New York funds.
†Includes other income (1934, $207,838).

The balance sheet, as of November 30, 1934, showed current assets of $4,604,990, and current liabilities of $507,394, leaving a working capital of $4,097,596. Current assets included $1,600,548 cash, and $1,228,016 government securities.

President J. D. Johnson commented: "In Canada the year 1934 has been one of steady progress toward better business conditions. A marked improvement in many lines of business has taken place, and of particular gratification has been the development in the export trade of the country. Notwithstanding many unsolved problems, very substantial progress has been made from the depths of the depression, all of which is encouraging. Referring more particularly to the building industry, some progress has been made, but less progress than in the majority of other lines of business. In no other important country is this industry at so low a point relatively as in Canada. It will be recalled, however, that the building industry in Canada was one of the industries that was late in feeling the effects of the depression and it is, therefore, probably natural that its revival should lag. The improvement which took place during the year is indicated by the building permits which increased 34% over 1933, a substantial improvement as expressed in percentage, but bearing in mind the extremely low volume of 1933, the volume increase is not of great proportions. It should be said the public works program of the Federal Government will not be reflected in demand for materials in substantial quantities until 1935.

"Your company's business showed an increase in volume of sales during the year in line with the somewhat better conditions prevailing in the building industry. The total consumption of cement in Canada was on a very restricted scale. While improvement was made over the 1933 volume, the total sales were disappointing when compared with normal years.

"The balance sheet reveals the improvement that took place in the business of your company in the period under review, showing somewhat better earnings than during the previous year. After providing for bond interest, an amount of $1,000,000 has been set aside for depreciation, and $105,699.76 has been carried forward to surplus account. The liquid position of your company has been still further improved, showing a better ratio of current assets to current liabilities. Earnings were not sufficient during the year to justify any payment on the preferred stock. Miscellaneous income, which includes interest on investments, held up remarkably well, and accounts for a considerable proportion of your company's earnings. The foreign exchange situation has been a great deal more favorable than in the years immediately preceding, so that the premium on foreign currency to cover bond interest payments was practically eliminated. Idle plant expense continues to be a heavy burden on account of the very low percentage of operation. No capital expenditures of any consequence were carried out during the year but your operating plants were well maintained.

"It is difficult to make a forecast for the coming year, but, from information gained from various sources at your company's command, we are inclined to believe that improvement in the building industry will be slow for immediate future."

Giant Portland Cement Co., Philadelphia, Penn., reports for the years ended December 31:

INCOME ACCOUNT

	1934	1933
Operating profit	$ 11,113	(d)$36,008
Depreciation	101,894	107,159
Loss on dismantled machinery	4,911	.....
Sack obsolescence reserve	25,000	.....
Deficit for year	120,691	143,167

As of December 31, 1934, the balance sheet shows current assets of $593,398 and current liabilities of $21,277; working capital, $572,121. Cash assets were $246,445.

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New England Lime Co., North Adams, Mass., reports for the years ended November 30:

INCOME ACCOUNT

	1934	1933
Net sales	$326,645	$286,812
Cost of sales	240,212	207,660
Operating expenses	63,452	60,599
Depreciation	101,950	103,031
Depletion	1,853	1,678
Operating loss	80,817	86,157
Other income	210	(dr)2,247
Total loss	80,607	88,404
Bond interest	72,000	72,000
Amortized bond discount	12,000	12,000
Deficit	164,607	172,404

Current assets as of November 30, 1934, were $113,855; current liabilities $10,319; cash $28,701; U. S. government securities at par, $23,886.

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American Lime and Stone Co., Bellefonte, Penn., reports for the years ending December 31:

INCOME ACCOUNT

	1934	1933
Net sales	$878,514	$715,174
Operating expenses, etc.	660,418	539,097
Depreciation and depletion	109,460	99,205
Operating income	108,636	76,872
Other income	25,822	22,436
Total income	134,458	99,308
Interest	66,774	71,680
Net profit	67,684	27,628
Times interest earned	2.01	1.39
Earned per share, common	$2.57	(d)$1.44

Current assets, as of December 31, 1934, were $317,238, and current liabilities $20,770, leaving a working capital of $296,468, of which $149,490 was cash; $73,543 receivables and securities.

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Wolverine Portland Cement Co., Coldwater, Mich., reports for the years ending December 31:

INCOME ACCOUNT

	1934	1933
Net sales	$353,167	$240,855
*Net income	32,364	8,234
Earned per share	$0.32	$0.08

Number of shares, 100,000.
*After depreciation, depletion, taxes, etc.

Current assets as of December 31, 1934, were reported as $376,593, a gain of nearly $60,000 over December 31, 1933. Current liabilities were $2,941 on December 31, 1934, against $9,678 on December 31, 1933. Cash assets were $77,290 and marketable securities $22,968.

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American Silica Sand Co., Ottawa, Ill., reports for the year ended December 31, 1934, a net profit, before depreciation and depletion, of $5,784, compared with a deficit of $17,805 for the calendar year 1933. As of December 31, 1934, the balance sheet showed current assets of $22,178 and current liabilities of $25,314.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Housing Program Suggestive of Profitable Sidelines for Aggregates Producers

Standard Size Concrete Brick Now One of the Units Offering Effective Competition to Clay Products—Products Described

CONCRETE ASHLAR blocks produced from a wide variety of aggregates now are being used increasingly for much modern construction—ranging from homes to theaters—where low cost, permanence and attractive appearance are among the requirements. Concrete masonry units in 1934 also made significant advances in gaining acceptance on school building and other projects hitherto considered "naturals" for clay products. Concrete brick, too, have been modernized to meet current building trends to the point where they may be seriously considered as prospective production sidelines for aggregates producers alert for ways and means to make up for declining tonnage.

In localities where concrete products plants are active, producers may shun the idea of competing with customers, but where products plants are lacking or dormant due to unprogressive management, crushed stone or sand and gravel plant operators cannot be blamed for putting their own plants in order to meet the impending demand generated by the National Housing Act.

Concrete brick has played an important part in the British housing boom, and in this country industrial buildings as well as residences of this particular concrete product successfully have stood competitive tests. A Michigan sand and gravel producer is a user of the concrete-brick production equipment to be described here.

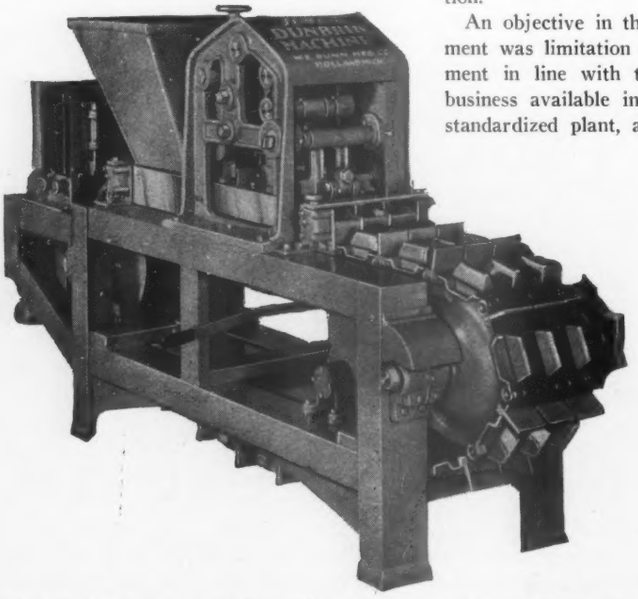
Newest Brick Type

Of U. S. standard size, the patented concrete-brick unit illustrated here has a troweled, water-repellant face, full mortar bed, and keyed bond. A feature of the new machine developed to produce such brick is that, by removing two dividing plates, it readily can be converted into a machine for making double and triple size units. These two additional units allow many types of hollow wall ashlar and load bearing construction.

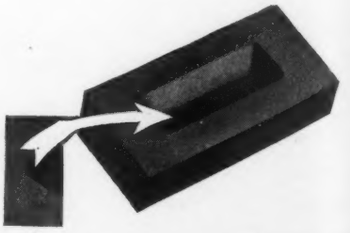
An objective in the design of this equipment was limitation of the required investment in line with the possible amount of business available in a given territory. A standardized plant, adopted from the automotive industry's line production methods, was designed that would produce this brick at the lowest possible cost.

"This equipment," says the W. E. Dunn Manufacturing Co., which developed it, "has been brought to such a degree of efficiency that many manufacturers are reporting costs of less than $5 per thousand with many additional advantages such as ability to haul 25% more brick per load, speeding delivery service and lowering hauling costs; high production speeds available, making it unnecessary to carry a large investment in inventory; ability to produce face brick in any color desired on short notice, again eliminating a large stock."

The machine is operated by a 2 hp. motor transmitting its power through an automotive type disc clutch connected directly to belt pulley. Driven directly from the pulley shaft is the worm gear drive running in an oil bath in dust proof gear housing. The continuous



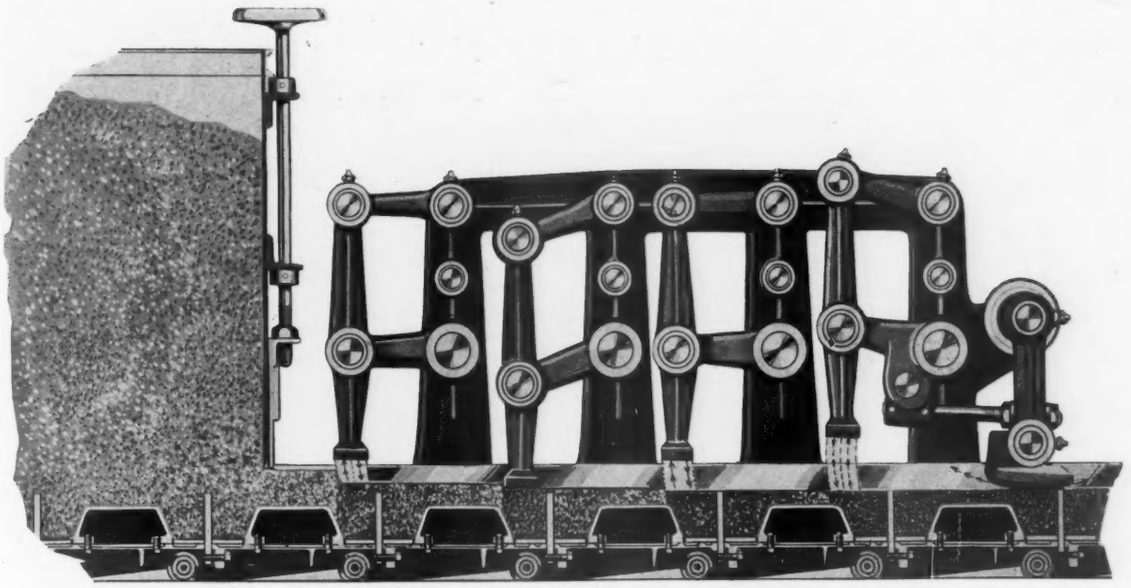
Patented concrete brick machine with capacity of 1500 units an hour



Light weight concrete brick unit. Note void



Single, double and triple brick made on one machine



Cross section of open bottom hopper compressing and finishing unit

chain of mold boxes is driven by spiral tooth beveled gears of nickel steel directly driven from the worm gear shaft. The "Junior Dunbrik" machine is designed to produce 1500 brick per hour. It is built with a heavy steel frame, electrically welded.

The brick are produced in a series of all-steel mold boxes in the form of a continuous chain, which passes under an open bottom feed hopper, and then under a graduated packer head with a controlled feed so that any desired compression may be obtained. The counter-balanced packer head operates on specially designed needle type roller bearing rollers, virtually eliminating vibration and wear.

The machine is equipped with an automatic pallet feeder making the operation all automatic so that only an off-bearer is needed; he removes the finished product as it is delivered to him on the continuous belt of the machine.

A number of plants have been established in England to produce this type of brick. Six plants serve the London area alone. The method adopted in building them was to set up the machines, operate them and use the initial output to build the factory around them. To produce standard quality, raw materials are carefully selected, graded, properly proportioned and thoroughly mixed. Steam curing of the finished product is recommended.

Concrete Products Corp., Seattle, Wash., has leased plant structures at 8th avenue south on the shore of the Duwamish waterway, where concrete products will be manufactured. The company has recently been granted a license from the American Concrete Pipe Co. and the Hume Concrete Pipe Co. of London to manufacture pipe under the Hume process in King county and vicinity. A. E. Fitzgerald is president of the corporation and D. E. Fitzgerald is secretary-treasurer.

Code Developments

Ready-Mixed Concrete Industry

Application made for approval of annual budget of Code Authority, March 1, 1935, to March 1, 1936, of $22,500 (hearing set for April 5).

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Concrete Pipe Manufacturing Industry

The Regional Administrative Committee for District 2, comprising the states of California, Arizona and Nevada, of the concrete pipe manufacturing industry has made application to the National Industrial Recovery Board for approval of a $1800 budget, and the basis of contribution, for the period from January 15 to June 16, 1935. The basis of assessment as provided in the industry's approved code is as follows: "The first assessment shall be the average annual tonnage produced for the three-year period ending December 31, 1932, or such part thereof as he has been engaged in this industry as provided in Article VI, Section 7, Paragraph B, and thereafter at the end of each calendar year each member of the industry shall file a sworn statement of the amount, on a tonnage basis, of concrete pipe of all classes produced by him during the preceding calendar year. In levying the assessment, the Code Authority shall divide the amount of money required by the total tonnage of members of the industry as at the end of the preceding calendar year, and each member shall pay his proportion, which shall be arrived at by multiplying his total tonnage by the quotient."

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Code Authority has applied for approval of a $19,800 budget, and the basis of contribution, for the period February 15, 1935, to February 15, 1936. The proposed basis of contribution may not be more than two cents per ton.

Cement Products

Wallace Concrete Pipe Co., Columbia, S. C., with plant at Lincoln and Tobacco streets, has been organized. C. A. Wallace, proprietor, has been associated with the Carolina Concrete Pipe Co. for the past five years, four of them as sales manager and the last as vice-president and sales manager. The new company, owned and operated by local capital, will have an improved up-to-date concrete pipe plant, manufacturing plain and reinforced concrete pipe for both sewer and highway work in addition to various other concrete products.

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D. E. Minton Construction and Manufacturing Co., Parsons, Kan., is building a ready-mixed concrete plant. It will be the first ready-mix concrete plant here. Mr. Minton expects to be able to furnish any quantity of concrete from a bucketful to 10,000 cu. yd. on order, the materials being mixed according to exact formulas and precision measurement to assure absolute uniformity. He will have a delivery service prepared to deliver concrete anywhere. A number of different products will be manufactured at the plant, including silos, fence posts, lawn furnishings and pre-cast building units of all kinds. One of the feature products will be a "lay-more" tile of a new interlocking type made in a special kind of machine. Mr. Minton has been in the construction business for 25 years, and for 22 years in Parsons.

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Tri-Mont Cement Block & Silo Co., Triumph, Minn., John and Harry Koch, proprietors, are installing a Monarch concrete-stone machine to increase their output.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of March 23:

New England

35308. To cancel rates named for **gravel** in Agent Van Ummersen's I. C. C. 143 from points in N. E. to points in W. T. L. territory.

Trunk

33297. **Crude phosphate rock,** C. L., from L. V. Ore Docks, Buffalo, N. Y., to International Agricultural & Chemical Co., Cheektowaga, N. Y., $16.20 per car. Present rate $9.10 per car.

33303. **Foundry sand,** in open and closed cars, C. L., (See Note 2), from Whiteheads, N. J., to Collegeville, Penn., $1.65 per net ton in open top equipment and $1.85 per net ton in closed cars.

Sup. 1 to 33303. **Foundry sand,** in open and closed cars, C. L. (See Note 2), from Perth Amboy district, Metuchen to Maurer, N. J., inclusive, to Collegeville, Penn., $1.65 per net ton in open top equipment and $1.85 per net ton in closed cars.

33324. **Stone, natural** (other than bituminous asphalt rock), crushed, C. L., (See Note 2), from Watertown, N. Y., to Lacona, Richland and Pulaski, N. Y., 85c per net ton. Present rate 91c per net ton.

33329. To establish switching rate of $3.15 per car on **stone** between sidings of H. E. Millard at Annville, Penn. Present rate 38c per ton.

33334. **Crushed stone,** C. L., from Bethlehem, Penn., to Ross Common and Saylorsburg, Penn., $1 per net ton.

33336. **Sand,** other than blast, engine, foundry, glass, moulding or silica; also **gravel,** C. L. (See Note 2), from Staunton, Va., to Mt. Crawford, Va., 78c per net ton. Present rate, $1.13 per net ton.

33338. **Sand,** common, building and engine, in open top equipment, also **crushed stone,** C. L. (See note 2), from Cumberland, Md., to points west thereto in the state of Pennsylvania located on the W. Md. Ry., P. & L. E. R. R., Monongahela Ry. and P. & W. V. Ry., Colmar, Bell, Connellsville, Edenburgh, Hays, Brownsville, Waynesburg, Penowa, Pittsburgh, Coverdale, Monessen, Penn., and various, rates ranging from 70c to $1.60 per net ton.

33347. **(A) Sand,** in open top cars, without tarpaulin or other protective covering, C. L.; **(B) sand,** other than ground or pulverized, in box cars, C. L. (See Note 2), from Curwensville, Penn., to Ford City, Penn.: (A) $1.40 and (B) $*2.10 per net ton. Present rate is 16c per 100 lb., sixth class. *Glass sand, $1.95 per net ton.

33355. **Sand,** in box cars or closed equipment (other than ground or pulverized and natural bonded moulding sand in box cars), C. L. (See Note 2), from Hancock, Great Cacapon and Berkeley Springs, W. Va., to Burnham, Penn., $1.70 per net ton.

33378. **Sand and gravel** (except blast, engine, foundry, glass, moulding or silica), C. L. (See Note 2), from Cuddebackville, N. Y., to Tannersville, N. Y., $1.65 per net ton. Present rate, 16c per 100 lb., sixth class.

Central

42300. To establish on **stone,** crushed, **stone screenings** and **agricultural limestone,** unburnt, in bulk, in open top cars, C. L., from Kenneth, Ind., to Warsaw, Ind., 100c per net ton. Route—Via P. R. R., Winona Lake, Ind., Winona R. R.

42301. To establish on **stone,** crushed, **slag** and/or **gravel,** coated with oil, tar or asphaltum, in open top cars, C. L., from Sandusky and Soldiers Home, O., to stations located on the B. & O., C. & O., N. Y. C., N. & W., and Virginia Rys. in the states of Kentucky, West Virginia and Virginia, shown in Exhibit A attached to C. F. A. Docket Bulletin 2547, dated November 20, 1934, rates on basis of the Martinsburg single or joint line scale, as the case may be.

Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so certify on shipping orders or bills of lading.

42311. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and **gravel,** C. L., Jonesville, Mich., to Toledo Dock, O., 107c per net ton.

42323. To establish on **limestone,** ground or pulverized, in box cars, C. L., minimum weight 60,000 lb., Carey, O., to points in Kentucky, Virginia and West Virginia located on the C. & O. Ry., N. & W. Ry., N. Y. C. R. R. and Virginian Ry. I. C. C. Docket 25220 basis, illustrations of which are shown below:

To (C. & O. Ry.)	Proposed (per net ton)
Limeville, Ky.	175c
Charleston, W. Va.	215c
Raleigh, W. Va.	245c
Tams, W. Va.	215c
(N. & W. Ry.)	
Naugatuck, W. Va.	215c
Filbert, W. Va.	255c
Pembroke, Va.	275c
(Virginian Ry.)	
Mullens, W. Va.	245c
Norcross, Va.	275c
Tams, W. Va.	255c
Wabun, Va.	295c

42365. To establish on **stone,** crushed, **stone screenings,** in open top cars, in bulk, carload, from Carey, Marion and Owens, O., to C & O Ry. stations in West Virginia located on the branches west of Gauley, W. Va., and main line east of Charleston to and including Gauley, W. Va., representative of which are shown below. Rates in cents per net ton.

To	(1)	(2)	(3)
Main Line:			
Gauley, W. Va.	195	180	180
Paint Creek Branch:			
Holly Grove, W. Va.	185	175	175
Whitaker, W. Va.	195	180	180
Huffs Creek Branch:			
Davin, W. Va.	195	180	180

(1) Proposed, from Cary, O.
(2) Proposed, from Marion, O.
(3) Proposed, from Owens, O.

42367. To establish on **stone, crushed** and **stone screenings,** in open top cars, in bulk, C. L., from Carey, Marion and Owens, O., to B. & O. R. R. stations in West Virginia, representative of which are as follows, rates in cents per net ton:

To	Proposed (1)	(2)	(3)
Etowan, W. Va.	190	180	180
Bream, W. Va.	190	180	180
Jarretts Ford, W. Va.	200	190	190
Glendenin, W. Va.	200	190	190
Cornwell, W. Va.	200	190	190
Marne, W. Va.	200	190	190
Sheldon, W. Va.	210	200	190
Dorfee, W. Va.	210	200	200
Clay, W. Va.	210	200	200
Dundon, W. Va.	210	200	200

(1) From Carey, O.
(2) From Marion, O.
(3) From Owens, O.

42379. To establish on **sand,** viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica, C. L., from Amherst, Ceylon and Huron, O., to Mineral, Annawan, Atkinson, East Moline, Moline and Rock Island, Ill., 327c per net ton.

42380. To establish on **sand,** all kinds, loaded in open top cars, C. L., minimum weight, from Polk and Raymilton, Penn., to Vandergrift, Penn., 130c per net ton.

42396. To establish on **stone,** raw or crude, crushed, ground or pulverized (unburned), in box cars, C. L., minimum weight 60,000 lb. from Genoa, Martin and Marblehead, O. Rates in cents per net ton:

To	Proposed
Elm Grove, W. Va.	202
Erie, Penn.	180
Ft. Wayne, Ind.	160
Maidsville, W. Va.	242
Moundsville, W. Va.	202
Parnassus, Penn.	202
Pittsburgh, Penn.	202
Van Voorhis, Penn.	202
Wellsburgh, W. Va.	202
W. Brownsville, Penn.	242

42406. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), or **gravel,** in open top cars, C. L., rates in cents per net ton, from Miamiville, Ohio, to Augusta, Ausanaba, Broshears, Dover, South Ripley, Ky., 110; Bradford, California, Carntown, Foster, Ivor, Mentor, New Richmond, Wellsburg, Willow Grove, Ky., 100; Dam No. 35, Oneonta, Ky., 90; Maysville, Ky., 120, being proposed rates. Route: Via P. R. R.–Cincinnati, O.–C. & O. Ry.

42407. To establish on (A) **sand and gravel,** in open top cars, C. L. (See Note 3), and (B) **slag,** commercial (a product of iron furnaces), C. L., minimum weight 80% of marked capacity of car, from Massillon, O., to Stone Creek, O., 75c. Route—Via P. R. R. direct.

42427. To establish on **crushed stone,** C. L., from Putnamville, Ind., to Patricksburg, 65c, and to Clay City, Ind., 70c per net ton.

42431. To establish on **stone,** crushed, coated with oil, tar or asphaltum (see note below), in bulk in open top equipment, C. L., from Erie, Penn., to North Warren, 113c, and to Clearfield, Penn., 161c per net ton. Note—The oil, tar and/or asphaltum is not to exceed 10% by weight of the commodity as shipped, the shipper to so certify on shipping orders and bills-of-lading.

42432. To establish on **stone,** crushed, and **stone screenings,** in bulk, in open top cars, carload, rates in cents per net ton, from Marble Cliff, O., to Man, Earling, W. Va., 180; West Gilbert, Lorado, W. Va., 190; West Hamlin, W. Va., 160, being proposed rates. Route: Via P. R. R.–Columbus, O.–C. & O. Ry.

42433. To establish on **crushed stone,** C. L., Keeport, Ind., to Elkhart, Ind., 110c per net ton. Route: Via Wab. Ry., Wabash, Ind., C. C. C. & St. L. Ry.

42485. To establish on **rubble stone,** C. L., Lehigh, Ill., to Linworth, O., 277c per net ton.

42486. To establish on (a) **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica) C. L., in open top cars, from Massillon to Randles, 85c; Rome and Rock Creek, O., 100c and on (b) **slag,** commercial, crushed, C. L., to Rome and Rock Creek, O., 100c per net ton. Route—Via P. R. R. direct.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Southern

7617. Cancellation—**Sand and gravel,** C. L., Elizabethton and Siam, Tenn., to Miller, Tenn. It is proposed to cancel, on the obsolete theory, the present published truck competitive rate of 40c per net ton from Elizabethton, Tenn., and 45c per net ton from Siam, Tenn., to Miller, Tenn., on sand and gravel, C. L.

7636. **Stone and granite,** crushed, C. L., Haile, Fla., to Fort Wentworth, Ga. It is proposed to establish reduced rate of 153c per net ton on stone and granite, crushed, carloads, (See Note 3), from and to above named points—same as rate applicable to Savannah, Ga.

7750. **Switching charges of the S. A. L. Ry. at Raleigh, N. C.** It is proposed to amend Note 1 of the reciprocal switching charges at Raleigh, N. C., as published in S. A. L. Ry. Terminal Tariff 2, I. C. C. A-6826, and substitute the rates shown below for those now in effect:

	Rate
Sand, gravel, crushed, rubble or broken stone, slag and chert, in straight or mixed C. L. (See Note 3), per ton, 2000 lb.	50c

7756. **Crushed stone,** C. L., points in S. F. A. territory to points in Official Classification territory. It is proposed to establish 12½% of first class on **stone,** natural, viz., marble, granite, limestone or sandstone, crushed, in bulk or in bags, in open top

cars (See Note 3), from points in S. F. A. territory to points in Official Classification territory.

7843. It is proposed to establish transit arrangements at Mt. Pleasant, Tenn., whereby wet **phosphate rock,** C. L., minimum weight 120,000 lb., may be shipped from Wales, Tenn., to Mt. Pleasant, Tenn., to be dried or dried and mixed and reshipped via the L. & N. R. R. to interstate destinations, subject to a transit rate of 12½c per net ton. Under this arrangement, reshipment of at least 82% of the inbound weight must be made within twelve months after the end of the calendar year; if there has not been reshipped 82% of the weight of the inbound movement, the local rate will be assessed on the deficit. To take care of any deficit that might result under this arrangement, it is proposed to establish a local rate of 57c per net ton on wet phosphate rock, C. L., minimum weight 120,000 lb., from Wales, Tenn., to Mt. Pleasant, Tenn.

Western

C-41-58. **Limestone,** C. L., from Mosher, Mo., St. Genevieve, Mo., and Davenport, Ia. At Joliet, Ill., to points in Ohio; Lower Peninsula of Michigan; Elkhart, Indianapolis and South Bend, Ind., Chicago and Waukegan, Ill., and Madison and Milwaukee, Wis. Rates: Present—Combination on Joliet, Ill. Proposed—To provide that shipments of limestone, C. L., may be stopped at Joliet, Ill., for grinding and sacking at a transit charge of 2c per 100 lb. in addition to the through rate and subject to rules shown in Items 600 to 750, inclusive, of C. R. I. & P. Ry. Freight Tariff 21500-V.

C-41-66—**Stone,** crushed, as described in Item 4170, W. T. L. Tariff 5-P, minimum weight same as now applicable in connection with present 13½c rate, from Ely, Minn., to Chicago, Ill. Rates: Proposed—12½c per 100 lb.

D-41-57. **Stone,** crushed, rubble, rip rap, etc., minimum weight and description per Item 2420, W. T. L. Tariff 6-S, from Ablemans, Lohrville and Red Granite, Wis., to St. Louis, Mo., and E. St. Louis, Ill. Rates: Proposed—270c per net ton.

D-41-57 (Sup. 1). **Stone,** crushed, rubble, rip rap, etc. Minimum weight and description per Item 2420, W. T. L. Tariff 6-S, from Montello, Wis., to St. Louis, Mo., and E. St. Louis, Ill. Rates: Proposed—270c per net ton.

D-41-60—**Stone,** rip rap, C. L. (See Note 2), from Earlham, Ia., to Onawa, Ia. Rates: Proposed—$1.08 per ton of 2000 lb.

D-41-62—**Stone,** crushed, ground or pulverized, C. L. (See Note 2), but not less than 40,000 lb., from Hannibal, White Bear, Mo., Quincy, Ill., and Louisville and Weeping Water, Neb., to Colorado common points. Rates: Proposed—$4 per net ton.

Sup. 1 to D-41-62—**Stone,** crushed, ground or pulverized, C. L. (See Note 2), but not less than 40,000 lb., from Carthage, Mo., to Colorado common points. Rates: Proposed—350c per net ton.

D-41-64. **Limestone,** crushed or ground, C. L., from Louisville and Weeping Water, Neb., to Wyoming points shown below. Rates: Proposed—(In cents per 100 lb.),

To—C. & N. W. points	Min. weight 60,000 lb.	Min. wt. 90% of marked capacity of car
Van Tassel, Wyo.	23½	21
Douglas, Wyo.	24	21½
Casper, Wyo.	25	22½
Powder River, Wyo.	26	23½
Riverton, Wyo.	27½	24½
Lander, Wyo.	28	25
To—C. B. & Q. points		
Altavan, Wyo.	23	20½
Bordeaux, Wyo.	24	21½
Wendover, Wyo.	23	20½
Casper, Wyo.	25	22½
Thermopolis, Wyo.	28	25½
Torrington, Wyo.	23	20½
Worland, Wyo.	28½	26
Guernsey, Wyo.	23	20½
Gilette, Wyo.	26	23½
Sheridan, Wyo.	28	25½
Parkman, Wyo.	28½	26
To—Un. Pac. points		
Yoder, Wyo.	23	20½
S. Torrington, Wyo.	23	20½
Laramie, Wyo.	24	21½
Rock Springs, Wyo.	29	26½
Granger, Wyo.	31	28½

D-41-67—**Chatt sand,** C. L. (See Note 3), the minimum weight in no case, however, to be less than 40,000 lb., from Atlas, Carthage, Granby, Joplin, Orongo, Porto Rico, Prosperity, Webb City and Carterville, Mo., to (St. Louis) Group 1. Rates: Proposed—Amend Item 3660 of W. T. L. Tariff No. 18-N by adding Group 1 (St. Louis) in the destination column at rate of 12c per 100 lb.

E-17-8. **Limestone,** agricultural; **superphosphate** (acid phosphate); **superphosphate** (acid phosphate) ammoniated; **phosphate rock,** acidulated, ground; L. C. L. in cartons, in barrels or boxes, or in bulk in bags, barrels or boxes. Between points in Western Trunk Line territory and points in Western Trunk Line and Southwestern Freight Bureau territory. Rates: Present—commodities are rated at 4th class, 1½ times Class E and Class 35; proposed—column 27 or 27% of first class rates.

E-41-59. **Limestone,** crushed or ground, C. L. (See Note 3), from Hannibal and White Bear, Mo.; also Quincy, Ill. to Trinidad, Colo. Rates: Proposed, $4.60 per ton of 2000 lb.

Southwestern

4789. **Silica stone,** Racine, Mo., to Colorado. To establish rate on silica stone, natural (tripoli), pulverized, in bulk in bags, C. L., of 37c per 100 lb., minimum weight 60,000 lb., from Seneca, Mo., to Colorado points taking Groups A and B on pages 32 to 35, inclusive, of L. E. Kipp's Freight Tariff No. 111-H; also Minnequa, Colo., Item 4540, to be amended accordingly.

4951. **Chatt sand,** southwest Missouri points to St. Louis group. It is proposed to add chatt sand to the description in Item 6910 of W. T. L. Tariff No. 18-N, I. C. C. No. A-2513, in connection with rate published to (St. Louis) Group 1.

Texas-Louisiana

9193-4-TX—**Sand and gravel,** C. L., from Glass to Caldwell, Texas: Proposition to establish rate of 45c per net ton, to expire with June 30, 1935. Proposed rate to meet truck competition.

9250-TX—**Sand,** C. L., from Cleveland to Houston: Proposition to establish rate of 50c per ton of 2000 lb. Rate to expire June 30, 1935. Proposed rate not to include the absorption of any switching charge at origin or destination.

9405-TX—**Sand and gravel** from Hart Spur and June Spur, Texas, to Midlothian and Venus, Texas: Proposition from carriers to establish following rates, from June Spur to Midlothian, 67c per ton, and from Venus, 72c per ton of 2000 lb., from Hart Spur to Midlothian and Venus, 67c per ton of 2000 lb.

9436-3-TX (Proposal 1205-TX) (expires March 30, 1935)—**Crushed stone,** C. L., from Lester and Maryneal, Texas, to Hale Center and Swastika, Texas: Proposition from shippers to establish the following rates subject to Item 2 of Texas Lines' Tariff 2-M:
From Lester, 64¾c per ton of 2000 lb.
From Maryneal, 96¼c per ton of 2000 lb.
Proposed rates to meet truck competition.

9619-1-TX—**Sand and gravel** in straight or mixed C. L., from Gemmer and Tanner Spur to Palacios: Proposition to establish rate of 75c per ton on sand and gravel, straight or mixed C. L., minimum weight as provided in Item 395, Supplement A, T. L. T. 2-M.

Illinois

2746-1. To cancel I. C. R. R. Tariff 15461-C, I. C. C. A-10084, publishing rates on **feldspar,** C. L., from St. Louis and Murphysboro to stations in Illinois and Wisconsin, also St. Louis, Mo., also from E. St. Louis, Ill., to Murphysboro, Ill., when originating at Keystone, S. D.

5717-E. Sand, moulding, C. L. (See Note 3), from Lipe, Tenn., to Litchfield, Ill. Present—$2.75 net ton. Proposed—$2.10 net ton.

WESTERN—

8031. **Sand and gravel,** C. L., Munger, Ill., to I. R. C. points. Present—Combination to and from Joliet, Ill. Proposed—See below (proposed rates in cents per net ton):

To (Rep. pts.)	
Thornton Jct., Ill.	90
Momence, Ill.	103
Clover, Ill.	106
Tuscola, Ill.	118
Danville, Ill.	144
St. Louis, Mo.	194
Curran, Ill.	131
E. St. Louis, Ill.	144
Kankakee, Ill.	93

8032. **Rock, phosphate,** crude, in bulk, minimum weight 80,000 lb., from Chicago, Ill., to Joliet, Ill. Present—8c per 100 lb. Proposed—70c net ton.

I. C. C. Decisions

26554. Silica Sand. Grasselli Chemical Co. vs. C. B. & Q. et al. By division 5. Rates on silica sand from the Ottawa, Ill., district to Cleveland, Ohio, found unreasonable to extent they exceeded $3 on shipments originating on the Burlington and $2.80 on the Rock Island. Reparation awarded.

26453. Silica Sand. Hughes Tool Co. et. al. vs. Burlington-Rock Island et al. By division 2. Complainants found entitled to reparation. Present rate of $5.86, effective April 1, 1934, on silica sand in box-car loads, from Ottawa, Ill., to Houston, Texas, found not unreasonable but rates charged prior thereto adjudged unreasonable to the extent they exceeded $5.86.

Proposed I. C. C. Decisions

26383. Crushed Stone. H. E. Fletcher Co. et al. vs. B. & M. et al. and I. and S. No. 4043. By Examiner J. J. Williams. Rates on crushed stone, grout, riprap and other quarry waste, and on rubble, from West Chelmsford, Mass., and South Milford, N. H., to destinations in trunk line and New England territories proposed to be found unreasonable, on materials the value of which does not exceed $1.50 a ton, to the extent they may exceed 10% of the existing first class rates on not less than 80,000 lb. Examiner recommended that the Commission find the rates assailed on rubble, the value of which exceeds $1.50 a ton, unreasonable to the extent they exceed the rates prescribed in 200 I. C. C. 65. He also recommended that the proposed increased rates on rubble from Georgia and the Carolinas to destinations in official territory be found not justified, and further suggested that the suspended schedules be ordered cancelled and proceeding discontinued.

Asks Lower Lime Rate

GAGER LIME MANUFACTURING CO., Chattanooga, Tenn, has applied for new and lower through rates to points in Ohio, Illinois, Indiana and West Virginia. The case is being presented by Earl DeL. Wood, secretary of the Chattanooga Manufacturers' Association, at a hearing before the I. C. C., set for April 8. Mr. Wood was recently in Washington, D. C., where he attended a hearing on the protest of Ohio lime manufacturers of discrimination in rates in general classification territory. The local association filed an intervening petition in the case.

Arkansas Intra-State Rate

AN order was issued March 2 by the Arkansas Corporation Commission authorizing the Rock Island railroad to put into effect a rate of 50c per ton for hauling sand and gravel from Newport to Tupelo in order to serve a state highway construction project. The rate was ordered on one day's notice in order to permit the railroad company to meet truck competition.

New Machinery and Equipment

Abrasion Resisting Alloy Steel

JOSEPH T. RYERSON & SON, INC., Chicago, Ill., has placed on the market a new abrasion-resisting alloy steel which is claimed to meet the demand for a material not only hard and tough, but with the maximum ductility, consistent with the hardness, so as to permit reasonable ease in machining, drilling, bending, and other necessary fabrication. In comparison with commercial soft steel plates, bars, etc., and even the higher straight carbon steel products, where resistance to wear and abrasion is concerned, it is claimed that from two to ten times longer life can be expected, using this special abrasion-resisting steel. The actual comparative life is, of course, dependent upon the exact nature of the application; the methods of fabrication necessary; danger of breakage due to high shock stresses; whether used in the natural condition as received, or heat treated, etc.

Typical applications in the rock product industries include chute lining, pulverizer liners and hammers, clam-shell bucket lips, dredge and sluice pipe, etc. The steel comes in plates and sheets for immediate shipment in No. 16 gage, from 36 x 96 in., to ½-in., 72 x 360 in., or cut into circles or irregular shapes.

Typical service records are claimed as follows: Hammers in coke pulverizers—"50% to 100% longer service than the high manganese alloy castings previously used, together with lesser initial cost." Blades in centrifugal sand and gravel re-conditioning machines—"1⅛-in. thick heat treated blades lasted 20 hours. Alloy castings, 2-in. thick, previously used, lasted two hours. Considerably less initial expense and cost of replacement." Coke chutes—"Ryerson abrasion-resisting plates lasting equally as well as special alloy plates previously used, which had cost four times as much."

While this steel, having an approximate tensile strength of 110,000 to 150,000 lb. per sq. in., depending on the temper, is naturally not as easily machined and fabricated as soft steel, it can be readily worked by following the directions given. It can also be welded with soft steel electrodes or welding rods, or a high manganese welding rod may be used. The new steel can be cold bent and formed for the less severe operations. Its abrasive-resisting qualities can be increased by heat treating.

Mining Cable

A NEW CABLE with loom-woven sheath, for use on mining machines, reel locomotives, and other applications of a similar nature where the cable must withstand severe mechanical abrasion, is now available from the General Electric Co., Schenectady, N. Y.

The finish of this cable consists of a circular-loom-woven sheath, applied in a manner similar to the weaving of a carpet. Under this sheath is a layer of Glyptal cement, the sheath being so applied that it is embedded in the cement and partially embedded in the rubber insulation. This process is claimed to result in a cable that is tough, extremely abrasion resisting, and, because of the Glyptal cement, highly resistant to oil, alkali, and acid.

Bulk Cement Carriers

FRUEHAUF TRAILER CO., Detroit, Mich., has supplied for service at the Norris dam, Tennessee Valley Authority, four semi-trailers, as illustrated, to haul bulk cement from rail terminal to site, 4½ miles on an 8% upgrade. Each holds 65 bbl.

At the starting point the cement is loaded out of box cars by means of a portable cement pump. Because the trailers all dump at the same spot, the front ends of the aluminum tanks were left free and are lifted by means of an overhead electric hoist, rather than by mounting an individual hoist mechanism on each unit.

Fuel Saving in the Cement Industry

BRADLEY PULVERIZER CO., Allentown, Penn., American agent for the Miag "Calcinator," has received records of fuel saving of foreign cement plant installations of this device in which the following claims are made by the manufacturer:

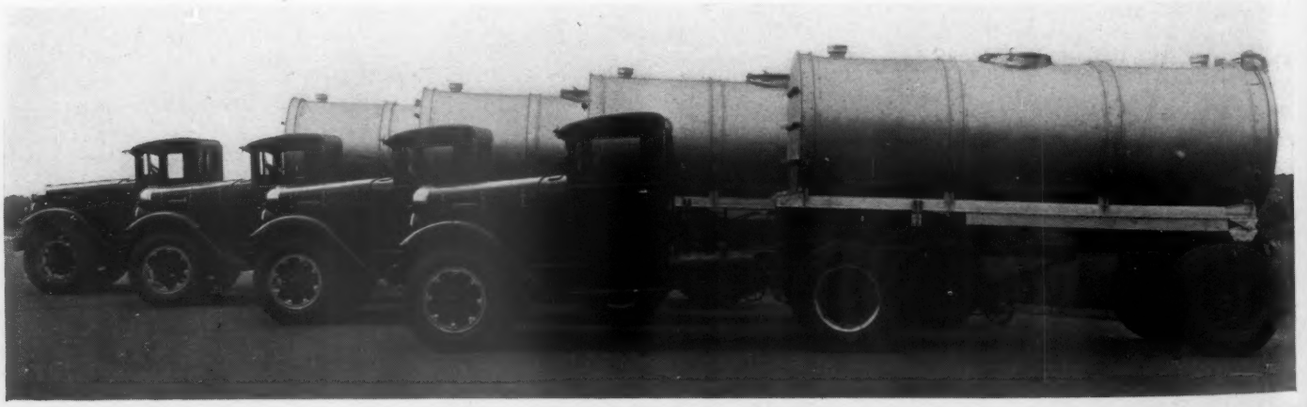
"A 7 x 8 x 213-ft. wet process kiln which had a fuel consumption of 1,080,000 B.t.u. per bbl., by adding a Calcinator (a clinker preheating device), reduced fuel consumption to 880,000 B.t.u., the output being increased from 800 to 1150 bbl. per day.

"Another kiln, 10 x 200 ft., is now operating on 915,000 B.t.u. per bbl., compared with 1,300,000 before installation of the Calcinator—output increased 1150 to 1460 bbl.

"Kiln burning slurry with 43% moisture formerly required 1,430,000 B.t.u., now requires 1,070,000; output increased from 1200 to 1610 bbl.

"Records of nine Calcinator-equipped kilns show an average of 24 2/9% reduction in fuel consumption in wet process plants, where the moisture in the slurry ran from 36% to as high as 45%. The average fuel consumption in these nine plants before installing Calcinators was 1,293,333 B.t.u., and afterward 990,555, the lowest fuel consumption being 880,000 B.t.u., and the highest 1,070,000. The lengths of these kilns vary from 130 ft. for the shortest, to 246 ft. for the longest.

"In an Italian cement plant a dry process kiln originally had a fuel consumption of 1,110,000 B.t.u., which through the introduc-



Four semi-trailers for TVA service

tion of Calcinators has been reduced to between 775,000 and 800,000, a reduction of 28%. This kiln originally had an output of 700 which has now been increased to 950 bbl. per day.

"In 1934, some 21 new installations were made abroad. The first American installation, at the St. Louis, Mo., plant of the Alpha Portland Cement Co., will be ready for operation some time in April."

Heavy Duty Pulsator

THE SMITH ENGINEERING WORKS, Milwaukee, Wis., has recently developed a heavy duty "Pulsator" for screening sand, gravel, crushed rock, ore or coal, either wet or dry. The eccentric action of the Pulsator produces a circular



Heavy Duty Pulsator

movement which is said to give a maximum screening action on every inch of the wire cloth, on every deck and under any load.

The frame is horizontal and the shaft is journaled in a complete, self-contained, independent unit—mounted on the frame—with the screen decks easily bolted therefrom. The vibrator unit is said to be easily removed in the field for necessary repairs. This new Telsmith Pulsator is made in 8 sizes from 2x6 to 4x12 ft.—single-, double- and triple-deck.

Liquid Belt Dressing—Rubber Substitute

A NEW BELT DRESSING, which merely softens the rubber belt surface but does not penetrate and deteriorate the body of the belt, is announced by B. F. Goodrich Co., Akron, Ohio. It is claimed to be safe and easy to apply, and the manufacturer also claims that it increases pulley grip and horsepower delivery of belts for a longer time after application than ever attained before. The company chemists and engineers recently have developed a new material, "Koroseal" by name, which is said to be superior to rubber for the manufacture of a wide variety of products. This material, it is said, may be molded into any shape, resists the action of various chemicals injurious to rubber, and possesses greater flexing life than rubber, according to the company engineers. They do not predict its displacing rubber in general use, but believe that it will under certain conditions.



Liquid belt dressing

Small Revolving Excavator

HARNISCHFEGER CORP., Milwaukee, Wis., announces a new full-revolving ⅜-yd. excavator, known as Model 100, "Bantam Weight." It weighs approximately 15,800 lb., and is convertible into crane, dragline, etc. It is designed for fast operation, with travel speeds 1½ to 3 miles per hour. Standard swing speed is 5 r.p.m. with P & H "split second" clutches. Other features claimed by the manufacturer are: short tail swing for working in close quarters; line boom chain crowd mechanism permitting booming up and down without changing the length of chain; full vision cab mounted far ahead of the main machinery,

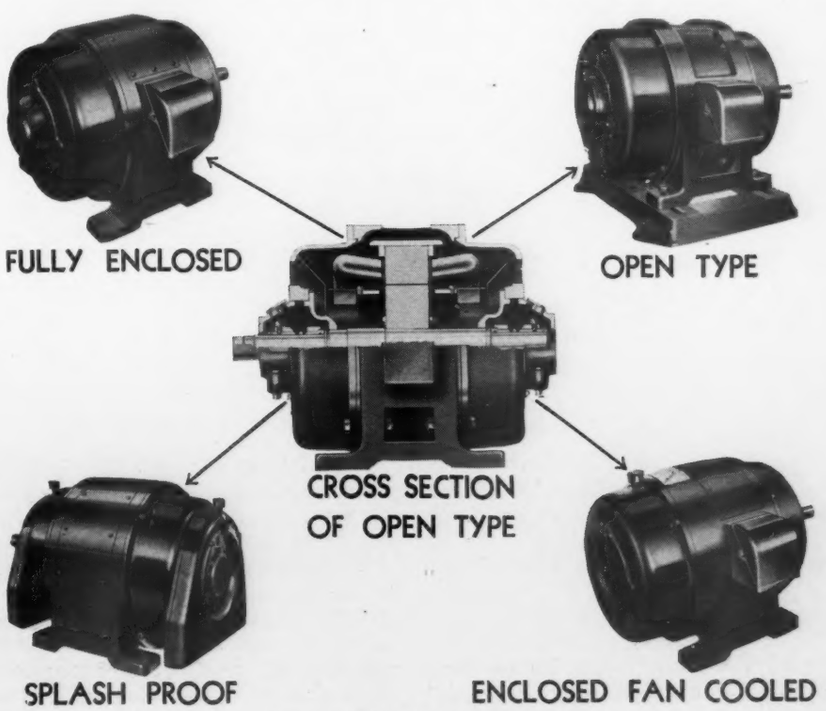


Small revolving excavator

permitting an unobstructed visibility of 210 deg. The fabrication is all welded: the revolving frame and side stands, for example, are a single piece. The boom is welded tube construction. Power is supplied by a Ford V-8 truck gasoline motor. Standard tractor links 10 in. wide (18 in. optional) form the tread.

Convertible Motors

HARNISCHFEGER CORP., Milwaukee, Wis., recently announced a new line of squirrel cage and slip-ring induction motors which are convertible to cover a great many different service requirements. The outstanding feature of these motors is their ready convertibility from open type to fan cooled, splash proof or totally enclosed construction, which is accomplished through the design of the frame, end heads and bearings to permit this interchangeability.



Convertible electric motors

Rock Products News Briefs

Silica

Dulassen Diatom Products Corp., Ltd., Solvang, Calif., has recently begun operation of a plant to mine and prepare diatomaceous earth on the H. C. Johnson ranch in the Santa Ynez valley. The officers of the company are: Paul H. Lassen, president; Anna Sorensen, secretary; Paul W. Fricke, treasurer, and J. Dutter, assistant secretary. The capacity of the plant is fifty tons of diatom every eight hours. To begin with, the plant will operate only one shift, until such time as the demand increases for the products from this plant. The warehouse has a capacity of 600 tons of the finished product, which is placed in large sacks. The plant will keep around 40 men employed when working at full capacity. J. O. Lauritzen has been employed as production engineer for the plant. Mr. Lauritzen has had considerable experience in this field of diatomaceous earth in Europe.

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Silica Sand Co., Pittsburg, Calif., is threatened with extinction if the Government persists in its proposal to cut the tariff on imported Belgian sand, which formerly had a considerable market on the West Coast. The Government proposes to reduce the tariff from the present $2 a ton figure to $1 a ton, and according to K. G. Schwegler, general manager of the company, this would put his firm out of business. The company has been able to mine and sell at a profit of 63 cents a ton, but with Belgian sand selling for $1 a ton less than at present the company could not compete. Last year the plant had a payroll of $64,395 and purchased supplies costing $21,000. The Belgium sand is brought to the Pacific Coast as ballast and therefore is given a favorable price in addition to its original low market value. Although the sand used for glass is not mined extensively in this locality, reduction of the tariff will hit the industry in scattered spots and throw many people out of work. Eastern Contra Costa county civic organizations have protested to California senators and representatives in congress, hoping to have the tariff reduction measure reconsidered.

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Everton Silica Sand Co., Everton, Ark., has started a new enterprise, producing glass sand, near Everton and Bellefonte, Ark. J. E. Potts is president. The capacity of the new plant will be 35 tons per hour of washed sand.

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Silica Products Co., Guion, Ark., has recently completed installation of much new sand-washing and separation equipment, designed to remove all impurities.

Peerless Products Co., Conneaut, Ohio, is the new name of the former **Peerless Sand Co.** The action was taken in view of the company's recent expansion in production and sales of materials covering foundry practices. The new line includes, besides the basic molding sands, fire clays and general refractory materials. Expansion is being made in response to a growing demand for heat resisting products necessary in foundry work, Fred L. Moore, president and general manager, said. The amendment of the company's articles of incorporation covering this change was approved by and filed with the secretary of state of Ohio, effective February 9, 1935. The personnel, management and corporate structure of the firm remain unchanged.

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Potomac Glass Sand Co., Wheeling, W. Va., has surrendered its charter and discontinued business. J. H. McNash was president of the company.

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Prices Bid

Clinton, Iowa.: A. A. Kriege's bid to furnish pit run gravel from the Charles Nissen pit near Camanche at 15c per cu. yd., was accepted by the board of supervisors Monday. The engineer was empowered to hire trucks to haul gravel to desired sites on roads under improvement at code prices of the Iowa Gravel Contractors Association of July 31, 1933, for gravel weighing 2,700 lb. per cu. yd, in mile units.

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La Fontaine, Ind.: After having gravel bids under consideration for more than a month the county commissioners have finally signed contracts with two pit owners for gravel to be used during the year. Other bids will be signed later as the board is able to inspect other pits. Contracts signed were with Tom Crumley at 44c per cu. yd. and Mark Enyeart at 40c. In each case the contract stipulated that only gravel used from the pits is to be paid for and that payment will not be made until after delivery has been accepted by the county.

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Rock Island, Ill.: W. G. Block Co., Davenport, Ia., was low bidder for furnishing stone for a gravel road leading from state route 84 to lock No. 16 in the lower part of Rock Island county. Three firms submitted bids to the Rock Island district of United States engineers. The Block proposal was $711 and an alternate of $468 if the material is delivered f. o. b. Muscatine. Other bids and alternates are: Builders Sand and Gravel Co., Davenport, $732 and $504; Rock Island Sand and Gravel Co., $810 and $525. The road will join route 84 at a point 700 ft. south of the Muscatine toll bridge and continue up the Illinois side of the Mississippi river one and one-third miles to the lock.

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Tiffin, Seneca County, Ohio: Basic-Dolomite, Inc., Cleveland, Ohio, and the France Stone Co., Toledo, Ohio, submitted bids to the county commissioners Saturday for furnishing stone for county road work. The bids of the former company ranged from 75 cents to $1 and of the latter from 65 cents to $1.50 according to the quarry from which delivery is to be made.

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Bloomington, Ill.: Bids for construction of about 40 miles of Gridley township roads for furnishing, pulling, screening, crushing, hauling and depositing gravel on the roads: Prothero & Willis, Bloomington, 93c per cu. yd.; W. H. Troike, Monticello, 86c; Willis Rowe, 73c, and W. M. Gibson, 72½c.

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Grafton, W. Va.: John Sergan, chief, purchasing section, U. S. Engineer office, Pittsburgh, Penn., announces awards for cement at $1.70 per bbl., delivered to the dam site, to: Medusa Portland Cement Co., Cleveland, Ohio, 300,000 bbl.; Bessemer Limestone & Cement Co., Youngstown, Ohio, 300,000 bbl.; Alpha Portland Cement Co., Easton, Penn., 600,000 bbl.

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Silicosis Suit Dismissed

A DAMAGE SUIT of Frank A. de Rousse, who did not know whether silicosis was a disease of the lungs or the eye, was dismissed by Federal Judge Faris in St. Louis, Mo., according to the *St. Louis Globe-Democrat*. De Rousse had asked $30,000 of the Pittsburgh Plate Glass Co. In dismissing the case Judge Faris admitted a stipulation offered by attorneys for the company asking dismissal of the case and which had been signed by De Rousse, an illiterate, with his mark.

In an affidavit accompanying the stipulation, De Rousse stated at the time he was approached by two men who later referred him to a lawyer, he told the pair he did not have a lung ailment. He said later at the suggestion of a lawyer he had an X-ray picture of his lungs taken.

De Rousse gave conflicting testimony at the time of the hearing on the stipulation. He stated at one time he thought the suit related to an eye injury.

Judge Faris in dismissing the case said as long as De Rousse had not been induced to sign the stipulation by fraud "he should not now be permitted for some occult reason to change his mind." De Rousse signed the stipulation November 9, 1933, at the office of the company in Crystal City, at which time he was paid $100.

THE INDUSTRY

New Incorporations

Amberg Granite Co., Amberg, Wis.; to deal in granite products; capital stock, $50,000; 250 shares common stock at $100 each, 250 shares preferred at $100 each. Incorporators are D. Daniels, L. D. Daniels and E. Grimmer.

Goldsboro Sand Co., Goldsboro, N. C.; to purchase, manufacture, sell or otherwise deal in builders' supplies and construction materials; authorized capital stock, $100,000; subscribed stock, $300 by James E. Bryan, Robert E. Bryan and Mary Zealy Bryan.

John Terranova, Inc., Richmond, N. Y.; marble, tile and other stone products; 200 shares no par. Filed by Schwartz & Schwartz, 280 Broadway, New York, N. Y.

United Mineral Products Co., Omaha, Neb.; chalk limestone, wholesale and retail; $25,000. Incorporators are G. H. Nelson, Roderick Le Bron, Victor I. Jeep.

The Cinder Concrete Block Corp., Camden, N. J.; concrete products; 100 shares no par. Agent is E. George Aaron.

Dunavant Quarries, Inc., Charlotte, N. C.; to mine, quarry and prepare for the market stones and minerals; authorized capital stock, $25,000; subscribed stock $300 by S. J. Dunavant, Mrs. H. J. Dunavant and Louise W. Dunavant.

Ohio River Sand & Gravel Co., Parkersburg, W. Va.; authorized capital stock, $5000. Incorporators are A. P. Turley, Joseph M. Murphy and Fred L. Davis.

Southwest Sand & Gravel Co., 302 Holland Bldg., Springfield, Mo.; $5000. Incorporators are C. B. Denton, W. B. Hedges and L. A. Weeks.

Dixon Gravel Co., Inc., foot of Monroe Ave., Dixon, Ill.; to purchase and sell gravel sand, cement and building materials; 50 shares p. v. common. Incorporators are Gass J. Byrd, Gottfried Loosli and Joseph Petersburger. Correspondent is H. C. Warner, Warner and Warner, Dixon.

Wallace Concrete Pipe Co., Lincoln and Tobacco Sts., Columbia, S. C.; to manufacture plain and reinforced concrete pipe for sewer and highway work.

Cinder Concrete Units, Inc., Somerville, Mass.; $1000; 200 shares at $5 each. President, Malcolm H. Frost; vice-president, William J. Bulman; treasurer, Roland H. Ellis, Watertown, Mass.

Smith & Brennan Pile Co., St. Louis, Mo.; capital, $22,000. Incorporators are James J. Burns, 6384 Glenmore, and Frank C. Zook.

Akeson Materials Co., Inc., Billerica, Mass.; sand and gravel; $25,000; 250 shares $100 each. President, Thilda Akeson; treasurer, John A. Akeson, 8 Sherman Pl., Woburn; and Elizabeth G. Akeson.

Graber Land, Inc., Buffalo, N. Y.; to deal in sand and gravel; capital, 1000 shares, no par value. Incorporators are Genevieve W. Daly, Thelma E. Ives and Daniel Mahoney. Filed by Donovan & Raichle, 11 Niagara St., Buffalo.

Poured Concrete Block Manufacturing Co., Memphis, Tenn.; to manufacture and build poured concrete building blocks and other concrete building material; by Wm. D. Satchfield.

Harbor Sand, Inc., Wilmington, Del.; to deal in sand, coal, gravel and mineral products; $200,000. Incorporators are M. M. Lucey, H. I. Brown and L. S. Dorsey.

Talco, Inc., Seattle, Wash.; to produce talc, soapstone and minerals; $2700. Incorporators are Albert C. Bise, William E. Oldfield and Norman C. Buchanan.

Certified Concrete, Inc., 3868 Michigan, East Chicago, Ill.; to deal in stone, gravel, cement, etc.; capital stock 1000 shares common of $10 par value. Incorporators are Charles L. Crowe, Eva S. Crow and Marcus Hershcovitz.

Personals

H. H. Lauer has resigned his position as superintendent of the Green Bag Cement Co., Neville Island, Penn., and has opened an office in sales and general consulting engineering work in the Law & Finance Bldg., Pittsburgh, Penn.

Wm. R. Carney, formerly vice-president of the Dolese & Shepard Co., Chicago, Ill., crushed stone producer, has been elected president of that company.

Raymond Weasner, formerly with the France Stone Co. at Bellevue, Ohio, has been appointed superintendent of the company's quarry at Bloomville, Ohio.

Geo. Driscoll, recently executive secretary of the crushed stone, sand and gravel and slag industries' district code committee at Wilmington, Ohio, has been appointed manager of the Chillicothe Sand & Gravel Co. and the Southern Ohio Quarries Co., succeeding the late Richard O'Neil, deceased.

Fred H. Rhodes has been elected president and general manager of the Monarch Cement Co., Humboldt, Kan., succeeding the late H. F. G. Wulf. Mr. Rhodes has been serving as manager since Mr. Wulf's death. He was formerly secretary-treasurer of the company.

Walter H. Wulf, son of the late H. F. G. Wulf, has been elected vice-president of the Monarch Cement Co., Humboldt, Kan., succeeding to the vacancy caused by the death of A. C. Kreitzer on January 6.

C. A. Brooke, sales manager, Monarch Cement Co., Humboldt, Kan., has been elected vice-president.



The late A. P. Sandles

F. A. Woolf, Wichita, Kans., has been elected secretary-treasurer of the Monarch Cement Co., Humboldt, Kan., succeeding Fred H. Rhodes, who has been elected president and general manager.

Floyd L. Martin has been elected treasurer and general manager of the Portland Concrete Pipe & Products Co., Portland, Ore. He was formerly with the Everett Concrete Products Co., Everett, Wash.

Myron A. Swayze, for a number of years chief chemist of Lone Star Cement Co., New York, has been promoted to be research director of the International Cement Corp., New York City. He will continue to make his home in Hudson, N. Y., where the company's new research laboratory was completed last year.

L. R. Pritchard, who was assistant chief chemist of the Lone Star Cement Co., New York, has been appointed chief chemist to fill the vacancy caused by the promotion of Mr. Swayze.

Lowell Burch of New York City has been elected a director of the North American Cement Corp., succeeding A. M. Tyree.

Charles A. Higgins, sales manager of the National Gypsum Co., recently made the principal speech at the industrial conference sponsored by the Federal Housing Administration at Atlanta, Ga.

Obituaries

Richard F. Hoyt, chairman of the board of International Cement Corp., died March 7, in New York City, at the age of 48. He was a member of the firm of Hayden, Stone & Co., investment bankers, who control the corporation.

Arthur J. Hoskin, former editor of *Pit and Quarry,* died March 13 at his home in Boulder, Colo. Mr. Hoskin was born in Wisconsin and was graduated from the University of Wisconsin in mining engineering in 1890. He was professor of mining engineering at the Colorado School of Mines and the University of Illinois and Purdue University until 1929, when he resigned to become editor of *Pit and Quarry.* During the past few years he had returned to his mining-engineering practice.

A. P. Sandles, secretary of the National Crushed Stone Association from 1918 until about 1923, died at his home in Columbus, Ohio, March 5, at the age of 64. In addition to being prominent in Democratic politics in Ohio for many years, he was the secretary of the Ohio Macadam Association and in that connection did much to put the National Crushed Stone Association on its feet during its formative period. "Put" Sandles, as he was known to all his friends, was born on an Ohio farm and served in various state capacities and twice sought the Democratic nomination for governor. At the time of his death, he was president of the American Citizen Life Insurance Co., Columbus, and vice-president and director of the Federal Land Bank of Louisville, Ky.

C. P. Steventon, chief purchasing agent for the International Cement Corp., died February 11 in New York City. He was former purchasing agent for the Bonner Springs (Kan.) plant of the Lone Star Cement Co. He is survived by his widow and one daughter, 11 years old.

Munroe Price Martin, salesman for Lehigh Portland Cement Co., Birmingham, Ala., committed suicide on February 12.

Samuel Horner, father of Charles Horner, president of the Kosmos Portland Cement Co., Louisville, Ky., died at his home near Philadelphia, Penn., on January 14.

Quarries

Quaker Sales Corp. (formerly Canoe Creek Stone Co.), Canoe Creek, Penn., announced operations were to be resumed April 1, following completion of much repair work and the installation of a complete new "black top" plant.

Iowa State Highway Commission crushed stone plant, Lotts Creek township, was recently moved to Adair county.

Nemaha County, Kan., is considering reopening an old quarry on the Mergenmeir farm near Seneca.

North Lee County, Iowa, will operate two new quarry projects as part of its FERA program.

Wapello County, Iowa, recently opened a quarry on the Theodore Stoessel farm, where gravel as well as crushed stone will be recovered.

Neosho County, Kan., county commissioners have approved projects for quarrying and crushing stone for five miles of surfacing.

Ray County, Mo., is reported considering purchase of a rock crusher for county highway purposes.

Bethany, Mo., city administration is considering buying a rock crusher for city paving.

Emporia, Kan., is considering buying a rock crusher for street paving.

Coffeyville, Kan., recently purchased a portable rock crusher.

Arkansas City, Kan., recently began operation on a municipal quarry.

El Dorado, Kan., is operating a portable crusher for street work.

J. W. Peters, Inc., Burlington, Wis., stone operator and trucking contractor, recently filed a voluntary petition in bankruptcy, with liabilities listed as $67,895 and assets as $75,263.

Buchanan County, Iowa, recently began quarrying rock for highway work.

Shelby, N. C., has purchased quarrying equipment for street and sidewalk construction.

Milan, Mo., recently purchased a portable rock crusher owned by Summers & Sorrell for city street work.

Wellsville, Kan., township board recently purchased a new portable rock crusher for street and road construction.

Chatfield, Minn., recently opened a quarry to be operated by FERA labor for production of agricultural limestone.

Roverud Bros., Spring Grove, Minn., were recently awarded contract for agricultural limestone as part of the soil erosion prevention project of the state.

New Hampton, Mo., recently purchased a portable rock crusher to be used for producing material for city streets.

Palmyra Township, near Baldwin, Kan., recently purchased a new portable rock crusher for highway construction.

Iowa State Highway Commission has taken over quarry on the W. J. Marrs farm near Mt. Ayr for county highway construction.

Peerless Stone Co., Lenapah, Okla., which was recently organized to lease the plant of the Union Traction Co., has moved its plant to a new location one-half mile south.

Labette County, Kan., commissioners are buying a new portable crusher to be used in road construction.

Lincoln Crushed Stone Co., Joliet, Ill., has recently resumed operations after a shutdown since last December. During the interim, a new Nordberg double-deck Symons vibrating screen was installed, making possible five new size separations.

National Stone Co., Joliet, Ill., plans to resume operation about April 15, after a shutdown since December.

Cannon Falls, Minn.: Wabasha county commissioners will spend $30,000 to provide crushed rock for county road improvements.

Missouri State Highway Department has leased the Hornecker rock quarry northeast of Oregon, Mo.

Frank M. Norberg, Inc., Pueblo, Colo., has leased the lime quarry owned by F. A. Townsend, near Beaulah, Colo., for a ten-year period.

Charleston, W. Va.: A program to provide agricultural limestone for West Virginia farm lands is planned by N. W. Taylor, engineer for the Rural Rehabilitation Corporation, who says that under the plan all available limestone crushers will be rented and pulverized limestone supplied to farmers at about $1 a ton.

Morgan County, Ohio, commissioners and county relief administration are said to be planning to open seven crushed stone quarries for highway stone.

Corinth, N. Y., is planning to spend $22,115 in the operation of a quarry to supply crushed stone for streets and roads this summer.

Junction City, Kan., county commissioners recently purchased a $1700 portable crusher.

Excelsior Springs, Mo., recently purchased a new portable rock crusher for city pavement construction.

Orofino, Idaho, recently completed a municipal rock crushing plant at the mouth of the Orofino Creek.

Silica

American Silica Sand Corp., Ottawa, Ill., is considering installing a belt conveyor in its Reynolds unit at Utica, Ill.

Utica Silica Sand Co., Utica, Ill., is making preparations to install a scraper bucket excavator, a belt conveyor and a crusher.

Sand and Gravel

S. & L. Gravel Co., Grand County, Ind., was recently awarded a contract of 12,000 cu. yd. by Huntington county commissioners.

Red Wing, Minn., boasts, in the report of its city clerk, that its sales of sand and gravel during 1934 totaled $7815.71 as against $571.33 in 1933. The increase is accounted for by the use of city produced material in the construction of the Fleischmann Halting Co.'s grain silos in 1934. The figures do not include the sand and gravel used by the city itself.

Horton Township, Minn., recently opened a new gravel pit for county highway work.

Montana State Highway Department has located a site for a sand and gravel pit near Columbia Falls, to be used in connection with the construction of a bridge over Flathead river and surfacing of federal highway No. 2.

Moline Consumers Co., Moline, Ill., will resume operation of its Ottawa plant within the next few days, after extensive repairing work.

Cement

Monarch Cement Co., Humboldt, Kan., closed for an indefinite period during the latter part of February. Shipments will continue from storage.

Dewey Portland Cement Co., Dewey, Okla., closed its plant March 1 for a six weeks' or two months' period, during which shipments will be made from stock.

Lone Star Cement Co., Kansas, Bonner Springs, Kan., was closed for the month of March because its storage silos were full.

North American Cement Corp., Security, Md., which has been closed since December, resumed operations March 11.

Alpha Portland Cement Co., Ironton, Ohio, resumed operations the first part of March after a shutdown of several weeks.

Lehigh Portland Cement Co., Fordwick, Va., was closed the latter part of February for at least a two months' period. According to the local newspapers, H. A. Johnson, superintendent, said that radical changes in the plant were contemplated.

Alpha Portland Cement Co., Manheim, W. Va., plant resumed operation February 25 after a shut down of several months.

Columbia Cement Division of the Pittsburgh Plate Glass Co., East Fultonham, Ohio, resumed operation the latter part of March on a 35% basis as a result of contract award for the Tygart Dam construction.

Universal Atlas Cement Co., Hudson, N. Y., resumed operation March 15 after several weeks' shutdown.

Beaver Portland Cement Co., Gold Hill, Ore., reported operating at the highest capacity for several years. The company recently leased the California and Oregon Coast railroad to move its stone from a quarry in Josephine County to Gold Hill.

Lone Star Cement Co., Hudson, N. Y., expected to resume operations April 1, after a shutdown of several weeks.

Manufacturers

Schaffer Poidometer Co., Pittsburgh, Penn., recently shipped four 20-in. poidometers to the Iola, Kan., plant of the Lehigh Portland Cement Co., to be used for feeding gypsum and clinker to Hercules mills. A similar machine was recently shipped to the National Gypsum Co., Clarence, N. Y.

Stroh Process Steel Co., Pittsburgh, Penn., recently delivered a 16-ft., 16-in. face, split girth gear and pinion to the Peerless Cement Corp., Detroit, Mich., for one of its two kilns. A similar type kiln gear was sold this company three years ago for its other kiln. Other recent sales of kiln gears by this company have been to the Superior Cement Co., Superior, Ohio; Louisville Cement Co., Speed, Ind.; Kosmos Portland Cement Co., Kosmosdale, Ky., and Universal Atlas Cement Co., Hudson, N. Y.

Laclede Christy Clay Products Co., St. Louis, Mo., recently announced the removal of its Chicago district sales office to 2452 West 5th Ave., Chicago. H. R. Hilles is district manager. The district office was formerly in the Peoples Gas Building.

Link-Belt Co., New York City, announces the appointment of the General Supply Co., S.A., Calle Balderas No. 56-58, Mexico, D.F., as their stock-carrying distributor of conveying and power transmitting machinery in the Federal District and the State of Mexico.

Joah Etchells, for 14 years associated with Richard K. Mead & Co., Inc., Baltimore, Md., consulting engineers in cement, lime, and gypsum, recently announced that he had taken over the business and that he would operate in the future under the name of **Joah Etchells, Successor to Richard K. Meade & Co., Inc.**

Blaw-Knox Co., Pittsburgh, Penn., according to a recent statement of A. C. Lehman, president of the company, experienced a substantial increase in orders during the current year. Mr. Lehman was recently elected chairman of the board of the company, and Irvin F. Lehman was elected president as his successor.

Thompson and Lichtner Co., Inc., Boston, Mass., recently added a testing machine of 400,000 lb. capacity to their laboratory equipment. It was said by the owners that this machine is one of the largest, if not the largest, testing machines in any purely professional laboratory in the country.

Babcock and Wilcox Co., New York, N. Y., has recently made a 25% reduction in the price of the "B and W Junior" firebrick. The company claims that the new reduced price extends the use of this brick, making its use economical in many furnaces, where its higher initial cost prevented it before.

Simplicity Engineering Co., Durand, Mich., recently announced that the **H. M. Davison Co.,** with offices in Newark, N. J., and New York City, had been appointed as resale agent for Connecticut, the southeastern portion of New York, and the northern half of New Jersey and Metropolitan New York City.

Timken Roller Bearing Co., Canton, Ohio, has announced the appointment of J. A. Robinson as district manager of the Automotive Division with headquarters at the Chicago office. Mr. Robinson was formerly in charge of the Dallas, Texas, office. H. W. Trump was promoted to the office of district manager of the Industrial Division with headquarters at Dallas, Texas.

Traylor Engineering and Manufacturing Co., Allentown, Penn., has recently printed a circular on crushing which can be secured upon application. Circular No. 95 has the title "For Worthwhile Efficiency, Bell-Shaped Crushing Heads Must Be Used with Curved Concaves." It describes the principle upon which the efficiency depends, and contains testimonials from users of bell-shaped heads with curved concaves.

E. I. du Pont de Nemours and Co., Inc., Wilmington, Del., held their 18th annual convention of the Technical Section, explosives department, at Wilmington, January 22 to 25. Lammot du Pont, president, and J. T. Brown, a vice-president, addressed the convention, and J. W. McCoy, general manager of the explosives department, reviewed the activities of the last year. There were discussions of 350 topics relating to explosives and their uses in mining, quarrying, highway, river and harbor work, and for agricultural purposes. The convention was attended by 345 men engaged in various branches of the explosives industry from all parts of the country.

Lincoln Electric Co., Cleveland, Ohio, through A. F. Davis, vice-president, as a result of its exhibit at the Metal Show in New York City, October 1 to 5, announces "Interest displayed in arc welding by those attending the show indicates that 1935 will be the greatest year in the history of the industry." Demonstrations were given on the welding of such new steel alloys as Corten, Man-ten, Sil-ten, Cromansil and Republic R. D. S.

Ohio Forge and Machine Corp., Cleveland, Ohio, is the name of the reorganized Gears and Forgings, Inc., which went into receivership April 1, 1932. The new corporation will operate the former Ohio Forge and Van Dorn Dutton divisions of Gears and Forgings, Inc., located on adjoining properties at Cleveland. Officials of the new company are F. H. Chapin, president of The National Acme Co., as chairman of the board; S. C. Dalbey, president, and J. M. Clem, vice-president, both of whom formerly operated the Ohio Forge Co.; H. B. Newell, formerly of the Fawcus Machine Co., Pittsburgh, and later vice-president of Gears and Forgings, Inc., is executive vice-president; T. E. Leighton of the original Van Dorn and Dutton Co. is secretary-treasurer; R. B. Tripp, former sales manager of the Ohio Forge Co. and later general sales manager of Gears and Forgings, Inc., is general sales manager of the new corporation. Renovation of the plants and their equipment is under way and additional equipment is being installed to increase facilities and cover a wider range of service.

Tyson Roller Bearing Corp., Massillon, Ohio, announces the following additions to its engineering and sales organization personnel: Robert W. Ballentine, district manager with headquarters at Milwaukee, Wis.; Hyman Ledeen, district manager with offices in San Francisco and Los Angeles, Calif.; Ben L. Crew, Jr., sales engineer assigned to the Detroit offices; E. L. Farnsworth, service sales representative with offices in New York City.

Cincinnati Rubber Manufacturing Co., Cincinnati, O., announces appointment of two new distributors for its line of mechanical rubber goods. Buffalo Rubber and Supply, Inc., Buffalo, N. Y., was named distributor for Buffalo and surrounding territory; and for the region around Memphis, the Tennessee Belting Co., Memphis, Tenn., is the representative. At a recent meeting of the board of directors John F. Joseph, formerly vice-president and general manager, was elected president of the company.

TRULY *Insensitive*

Only detonation can set it off—that's what we mean when we say Cordeau-Bickford is an *insensitive detonating* fuse. Neither friction, fire nor any ordinary shocks will explode it. As a consequence, it can be safely stored and handled.

That's why Cordeau is so safe to use—and one of the reasons why it will save you money. Both loading and hook-up are done with an insensitive detonating agent.

But the reduction of hazard is not the only way in which Cordeau-Bickford will save you money! There are four others. Ask us for them and then give Cordeau a "try". . . . The Ensign-Bickford Company, Simsbury, Conn. Estab. 1836.





CORDEAU
DETONATING FUSE
BICKFORD
ALSO SAFETY FUSE *Since* 1836

THE ENSIGN-BICKFORD COMPANY

CB41

GOODRICH BELT
Saves this u

. . . new Goodrich service prolongs conveyor belt life in two ways . . .

Reading time 75 seconds

GOODRICH refused to "play ostrich" and ignore the fact that accidents will frequently damage the best conveyor belt in the world. Goodrich acknowledged the user's problem on conveyor belt repairs. And solved it!

Also, rubber belts rarely fail. It's the lacings or fasteners. So this new Goodrich service eliminates these enemies to belt life, by making belts endless on the job.

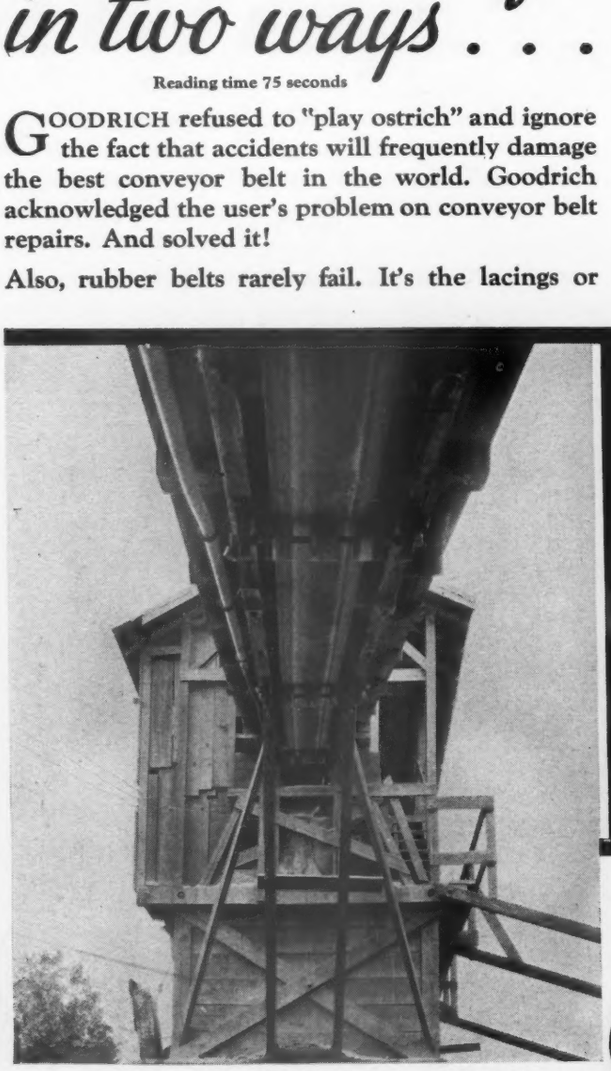
This Goodrich service is a new portable vulcanizer available to you with the services of trained belt men, for use in your own plant.

One user of this new service says—

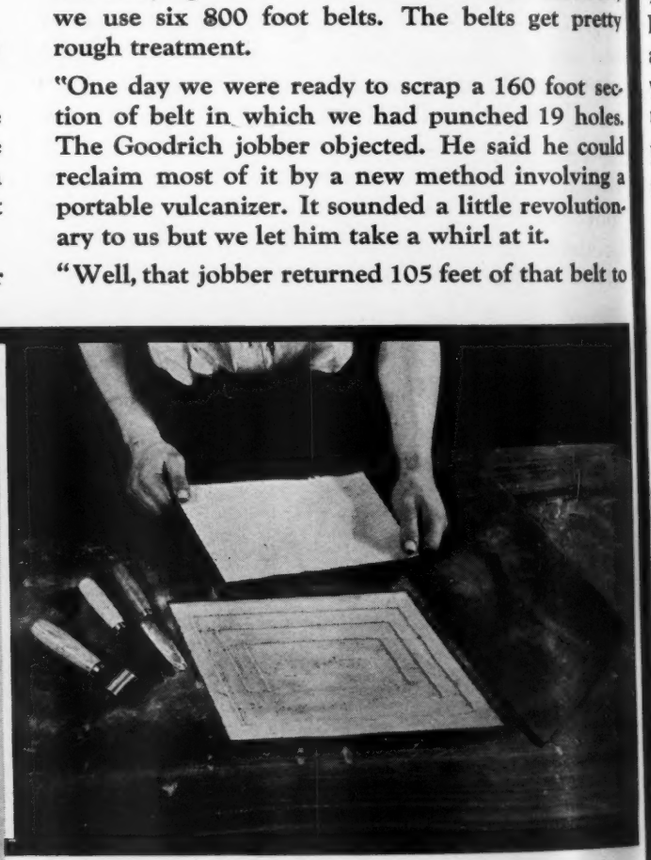
"In carrying coal from the mine to our crushers, we use six 800 foot belts. The belts get pretty rough treatment.

"One day we were ready to scrap a 160 foot section of belt in which we had punched 19 holes. The Goodrich jobber objected. He said he could reclaim most of it by a new method involving a portable vulcanizer. It sounded a little revolutionary to us but we let him take a whirl at it.

"Well, that jobber returned 105 feet of that belt to



Viewed from any angle, Goodrich Conveyor Belts do the job better, at lower cost.



One step in the Goodrich Conveyor Belt repair method, by which the injured area is restored to usefulness.

Goodrich

REPAIR METHOD user $422

us and charged us $225. The repaired section of this belt has proved every bit as good as any section of the original belt. Replacement would have cost $647. In this one instance we saved $422.

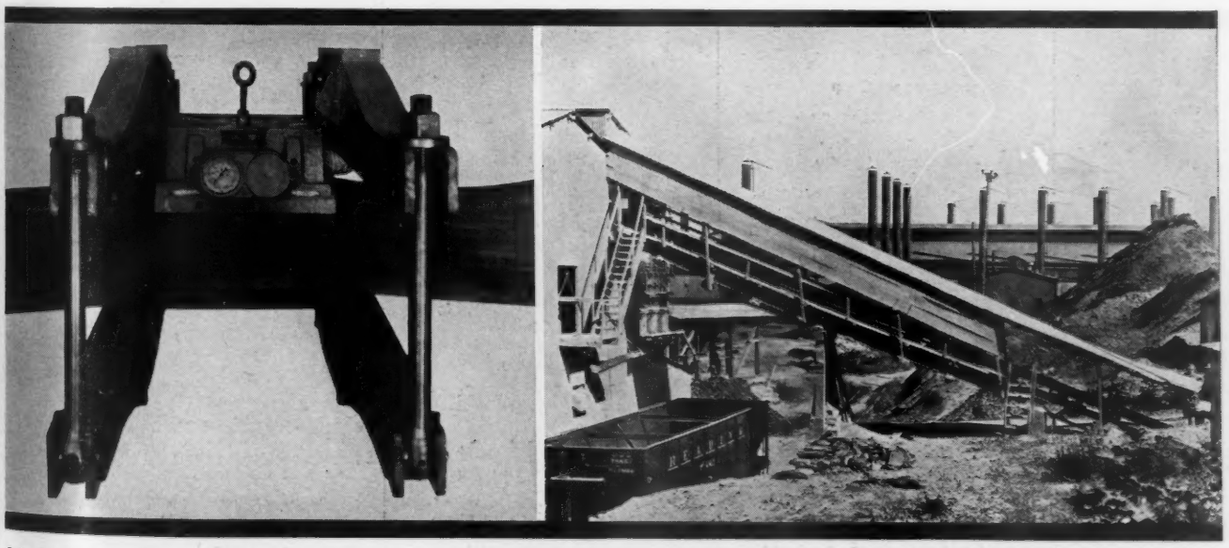
"That Goodrich repair method is the most important development in belt maintenance yet brought to our attention."

You, too, can save by using this Goodrich service. It saves belts by eliminating destructive fasteners and lacings, and by repairing injuries it can give you months or years of service from belts you now throw away.

Find out more about this easiest and quickest way to reduce your belt costs per ton delivered. See your Goodrich Distributor or write The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

GOODRICH MECHANICAL RUBBER GOODS FOR THE ROCK PRODUCTS INDUSTRY INCLUDE:

- *Conveyor, Elevator and Transmission Belting*
- *Multiple-V Belts*
- *Air, Water, Fire, Steam, Suction and Cement Discharge Hose*
- *Rubber Lining for Ball Mills*
- *Chute Lining*
- *Dredging Sleeves*
- *Packing . . and*
- *A Complete Line of Miscellaneous Rubber Items*



Only this portable vulcanizer and a few hand tools are necessary to prolong conveyor belt life by the Goodrich method.

ALL *products problems* IN RUBBER

Goodrich Conveyor Belts, like cats, have several lives due to the Goodrich Belt repair method.

Conveyor Belting

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Acetylene Welding Rod
American Steel & Wire Co.

Agitators, Thickeners and Slurry Mixers
F. L. Smidth & Co.

Air Compressors
Curtis Pneumatic Machy. Co.
Fuller Co.
Gardner-Denver Co.
Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.
Worthington Pump & Machy. Corp.

Air Filters
Fuller Co.

Air Hoists
Curtis Pneumatic Machy. Co.

Air Separators
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Armorite (for Chute Lining)
B. F. Goodrich Rubber Co.

Automatic Weighers
Richardson Scale Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backdiggers
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Backfillers
Bucyrus-Erie Company
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Bagging Machinery
Richardson Scale Co.

Ball Bearings
S K F Industries, Inc.

Balls (Grinding, See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
Lorain Steel Co.
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co., Division of National Equipment Corp.

Batchers
Fuller Company

Bearings
Chain Belt Co.
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Roller)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
S K F Industries, Inc.
Timken Roller Bearing Co.

Belting (Elevator and Conveyor)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
Robins Conveying Belt Co.
United States Rubber Co.

Belting (Transmission)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.

Bin Gates
Chain Belt Co.
Fuller Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Richardson Scale Co.
Robins Conveying Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Bins
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Blasting Cap Protectors
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.

Blasting Machines
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
S K F Industries, Inc.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Boilers
Combustion Engineering Corp.
Babcock & Wilcox Co.

Boots and Shoes
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Buckets (Dragline and Slackline)
American Manganese Steel Co.
Bucyrus-Erie Co.

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Cross Engineering Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Robins Conveying Belt Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.

Bulldozers
Koehring Co., Division of National Equipment Corp.

Cableways
American Steel & Wire Co.
Link-Belt Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Cars (Dump)
Lorain Steel Co.

Car Pullers
Link-Belt Co.
Robins Conveying Belt Co.

Cars (Quarry and Gravel Pit)
Lorain Steel Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Chain Belt Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Chain Belt Co.
Link-Belt Co.

Chain Drives
Chain Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chutes and Chute Liners
American Manganese Steel Co.
Cross Engineering Co.

Chutes for Minimizing Segregation
Robins Conveying Belt Co.

Classifiers
Knickerbocker Co.
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
American Steel & Wire Co.
Macwhyte Co.
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills
Gardner-Denver Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressors (See Air Compressors)

Concaves
Allis-Chalmers Mfg. Co.

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co., Division of National Equipment Corp.

Conveyor Idlers and Rolls
Chain Belt Co.
Link-Belt Co.
Robins Conveying Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Chain Belt Co.
Fuller Company
Industrial Brownhoist Corp.
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyoweighs
Richardson Scale Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Chain Belt Co.
Link-Belt Co.

Couplings (Hose, Pipe, etc.)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Cranes (Air-Powered)
Curtis Pneumatic Machy. Co.

Cranes (Clamshell)
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Co., Division of National Equipt. Corp.

Cranes (Crawler and Locomotive)
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co., Division of National Equipt. Corp.
Lima Locomotive Works, Inc (Ohio Power Shovel Co.)
Link-Belt Co.
Marion Steam Shovel Co.

Cranes (Excavator
Koehring Co., Division of National Equipt. Corp.

Cranes (Gantry)
Industrial Brownhoist Corp.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.
Industrial Brownhoist Corp.

Crusher Parts
American Manganese Steel Co.
American Pulverizer Co.
Pennsylvania Crusher Co.

Crushers (Hammer)
American Pulverizer Co.
Dixie Machy. Mfg. Co.
Pennsylvania Crusher Co.
Lorain Steel Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc. (Jaw))
Good Roads Machy. Corp. (Jaw)
Lewistown Fdy. & Mach. Co.
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Crushers (Reduction)
Bonnot Company

Crushers (Ring)
American Pulverizer Co.

Crushers (Rotary)
American Pulverizer Co.
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
American Pulverizer Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
New Holland Machine Co.
Traylor Eng. & Mfg. Co.

Derricks and Derrick Fittings
Harnischfeger Corp.

Silica sand used in the manufacture of glass is quarried and refined at the Pennsylvania Glass Sand Corp's. large operation at Mapleton, Pa.



QUARRIES REDUCE OPERATING COSTS WITH GULF LUBRICANTS



Above is the interior of the storage house at one of the Pennsylvania Glass Sand Corporation's plants. Gulf lubricants keep this overhead crane in continuous, trouble-free service. The photograph below shows the processing of the sand.



Pennsylvania Glass Sand Corporation Increases Production and Makes Savings in Plant Costs

HERE IS ANOTHER leading rock products plant in which definite cost reductions have accompanied the use of Gulf quality lubricants and engineering service!

When a Gulf engineer surveys your plant, his one aim is to find means of reducing your maintenance, power and lubrication costs while improving the efficiency of your equipment.

Gulf's cost saving lubrication plan is being put to work in all types of plants throughout the country. If you are not using Gulf lubricants, give them a trial.

GULF REFINING COMPANY, Pittsburgh, Pa.

District Sales Offices:

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NEW ORLEANS • HOUSTON • PITTSBURGH
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Title.....
Company.....
Address.....

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Detonators
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Diaphragms (Pump)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Dippers (Manganese Steel)
American Manganese Steel Co.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.
Marion Steam Shovel Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co., Division of National Equipt. Corp.

Ditchers
Bucyrus-Erie Co.
Harnischfeger Corp.
Marion Steam Shovel Co.

Draglines
Bucyrus-Erie Co.
Harnischfeger Corp.
Link-Belt Co.
Marion Steam Shovel Co.

Draglines (Gasoline or Electric)
Koehring Co., Division of National Equipt. Corp.

Dragline Excavators
Bucyrus-Erie Co.
Harnischfeger Corp.
Marion Steam Shovel Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Marion Steam Shovel Co.
Sauerman Bros.

Dragline Excavators (Walking)
Bucyrus-Monighan Company

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Marion Steam Shovel Co.
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Drill Bits
Timken Roller Bearing Co.

Drill Sharpening Machines
Gardner-Denver Co.

Drilling Accessories
Worthington Pump & Machy. Corp.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills (Blast Hole)
Worthington Pump & Machy. Corp.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Gardner-Denver Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.
Worthington Pump & Machy. Corp.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Eng. & Mfg. Co.

Dumptors
Koehring Co., Division of National Equipt. Corp.

Dust Arrestors
Pangborn Corporation

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Pangborn Corporation

Dust Control
Pangborn Corporation

Dust Conveying Systems
Fuller Company

Dust Hoods and Helmets
Pulmosan Safety Equipment Corp.

Dynamite
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Electric Cables and Wires
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.

Engineers
Bonnot Company
Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.

Engines (Diesel)
Nordberg Mfg. Co.
Worthington Pump & Machy. Corp.

Engines (Gasoline, Kerosene and Oil)
New Holland Machine Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co., Division of National Equipt. Corp.

Excavators (Dragline)
Koehring Co., Division of National Equipt. Corp.

Explosives
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Fans (Exhaust)
Pangborn Corporation

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc.
Robins Conveying Belt Co.
Schaffer Poidometer Co. (Weighing)
Smith Engineering Works (Plate)

Flights
Cross Engineering Co.

Forges (Oil)
Gardner-Denver Co.

Forging Furnaces (For Drill Steel)
Worthington Pump & Machy. Corp.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Gasoline
Texas Company

Gears and Pinions
Chain Belt Co.
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples (Stone)
Hayward Co.

Grease
Gulf Refining Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Lorain Steel Co.

Grizzlies
American Manganese Steel Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Guards (Wire)
National Wire Cloth Co.

Hammer Drills
Gardner-Denver Co.

Hammer Mills (See Crushers)

Hard Facing Materials
McLean Welded Products Corp.

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Worthington Pump & Machy. Corp.

Hoists
Curtis Pneumatic Machy. Co.
Gardner-Denver Co.
Harnischfeger Corp.
Link-Belt Co.

Hose (Water, Steam, Air Drill, Sand Suction and Discharge)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

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Curtis Pneumatic Machy. Co.

Insulation (Electric)
General Electric Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills). See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Link-Belt Co.
Marion Steam Shovel Co.
Robins Conveying Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
American Steel & Wire Co. (Wire Rope)
Gulf Refining Co.
Macwhyte Co. (Wire Rope)
Texas Company

Machinery Guards
Harrington & King Perforating Co.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
American Manganese Steel Co.

Mechanical Rubber Goods
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bonnot Company
Knickerbocker Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

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Babcock & Wilcox Co.
Lorain Steel Co.
F. L. Smidth & Co.

Mine Handling Equipment
Chain Belt Co.

Mixers (Concrete)
Koehring Co., Division of National Equipt. Corp.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Harnischfeger Corp.

Nitramon
E. I. du Pont de Nemours & Co., Inc.

Nozzles (Gravel Washing)
Chain Belt Co.

Oil Burners
Babcock & Wilcox Co.

Oils (Lubricating)
Gulf Refining Co.
Texas Company

Overhead Traveling Cranes
Curtis Pneumatic Machy. Co.

Packings (Pump, Valve, etc.)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Paint (Asphalt)
Texas Company

Partitions (Wire)
National Wire Cloth Co.

Pavers (Concrete)
Koehring Co., Division of National Equipt. Corp.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

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Hendrick Mfg. Co.

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Schaffer Poidometer Co.

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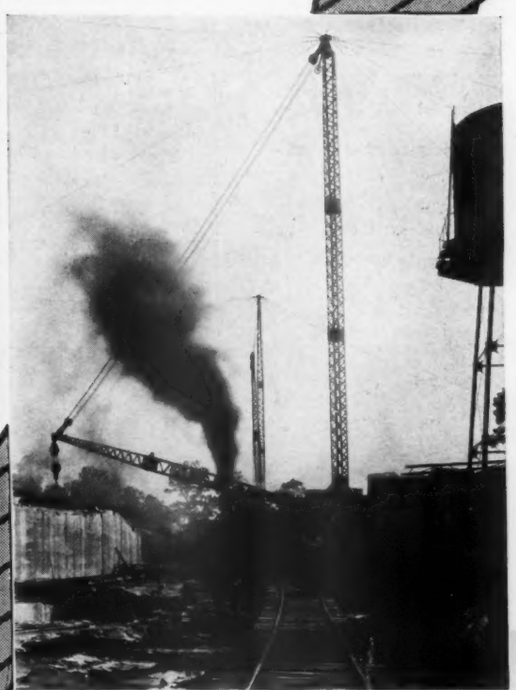
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For alphabetical index, see page 2

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Fuller Company
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Robins Conveying Belt Co.

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Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

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Power Transmission Machinery
Chain Belt Co.
S K F Industries, Inc.

Pulverizer Parts
American Manganese Steel Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Babcock & Wilcox Co.
Bonnot Company
Dixie Machy. Mfg. Co.
Knickerbocker Co.
New Holland Machine Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Company
Worthington Pump & Machy. Corp.

Pumps (Cement)
Fuller Company

Pumps (Cement Mill)
Worthington Pump & Machy. Corp.

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American Manganese Steel Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Morris Machine Works
A. R. Wilfley & Sons
Worthington Pump & Machy. Corp.

Pumps (Drainage)
Worthington Pump & Machy. Corp.

Pumps (Dredging)
American Manganese Steel Co.
Bucyrus-Erie Co.
Morris Machine Works

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Bacock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Morris Machine Works
A. R. Wilfley & Sons

Ready Mixed Concrete (Truck Mixer Bodies)
Chain Belt Co.

Respirators
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Road Machinery
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Industrial Brownhoist Corp.
Koehring Co., Division of National Equipt. Corp.
Marion Steam Shovel Co.

Rock Bits (See Drill Bits)

Rock Hammers
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Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
S K F Industries, Inc.
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Rubber Covered Screens
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scales (Automatic Proportioning)
Richardson Scale Co.

Scales (Cement)
Richardson Scale Co.

Scrapers (Power Drag)
Harnischfeger Corp.
Link-Belt Co.
Sauerman Bros.

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American Manganese Steel Co.
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Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
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Morrow Mfg. Co.
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John A. Roebling's Sons Co.
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Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.
Universal Vibrating Screen Co.

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Smith Engineering Works

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Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

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Hardinge Company, Inc.
Knickerbocker Co.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Company
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co., Division of National Equipt. Corp.
Link-Belt Company
Marion Steam Shovel Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

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Robins Conveying Belt Co.

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Williamsport Wire Rope Co.

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Traylor Eng. & Mfg. Co.

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Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
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Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
Link-Belt Co.

Texrope Belts (for Texrope Drives)
B. F. Goodrich Rubber Co.

Tires (for Commercial and Passenger Cars)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.

Tires and Tubes
United States Rubber Co.

Track Equipment
Lorain Steel Co.
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co., Division of National Equipt. Corp.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trippers
Robins Conveying Belt Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
Nordberg Mfg. Co.

Valves (Pump)
B. F. Goodrich Rubber Co.
Manhattan Rubber Mfg. Co.
United States Rubber Co.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Hardinge Company, Inc.
Knickerbocker Co.
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Waste Heat Boilers
Combustion Engineering Corp.

Weigh-Mix
Koehring Co., Division of National Equipt. Corp.

Weighing Equipment
Richardson Scale Co.
Schaffer Poidometer Co.

Welding and Cutting Apparatus
Harnischfeger Corp.
McLean Welded Products Corp.

Welding Rod
American Steel & Wire Co.
McLean Welded Products Corp.
Joseph T. Ryerson & Son, Inc.

Welding Supplies
McLean Welded Products Corp.

Welding Wire
American Steel & Wire Co.
McLean Welded Products Corp.
John A. Roebling's Sons Co.

Wire (Rubber Insulated)
American Steel & Wire Co.
United States Rubber Co.

Wire Rope Sockets (See Sockets, Wire Rope)

Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
Ludlow-Saylor Wire Co.
National Wire Cloth Co.
John A. Roebling's Sons Co.

Wire Rope
American Cable Co., Inc.
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Cable Co., Inc.
American Steel & Wire Co.
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Co.
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Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire (Welding)
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Rock Products reaches more plants than any other paper



WORTHINGTON ROCK MASTER

SPEEDS UP DRILLING

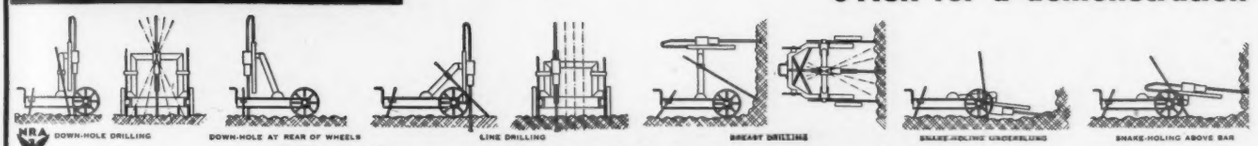
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- ***Ask for a demonstration***



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LASTS MANY TIMES LONGER

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Indicate application below for further facts and figures.

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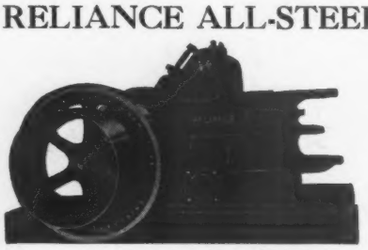
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CENTRIFUGAL AIR SEPARATOR

Now you get 25 to 40% increased capacity with 25 to 30% greater recovery of fines. Product is more uniform—you get increased capacity—cleaner tailings and higher efficiency than is possible with any other air separator. Delivers products of any desired screen analysis from 60 to 400 mesh.

Many of these machines have been running 24 hours per day for years without interruption. Rugged construction plus high quality, wear-resisting material assures long, efficient, economical service.

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The P&H BANTAM WEIGHT
(MODEL 100 - ⅜- yd.)

A REAL CHAMPION
FOR LOW COST DIRT MOVING
IT'S HUSKY AND FAST



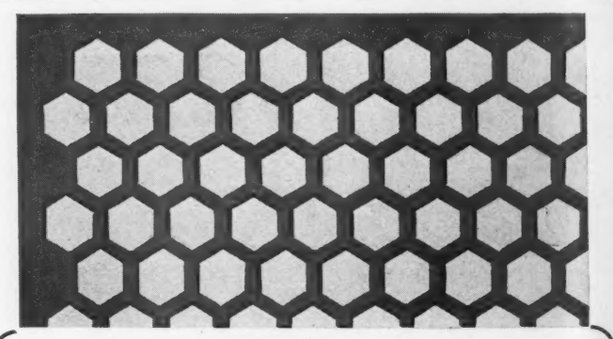
As new as tomorrow's champion! A fast-moving, hard digging excavator that tips the scales at only 15,800 pounds! It's a full-revolving ⅜-yd. machine that steps a year ahead in excavator design . . . does more for less money. Liberally powered by the smooth Ford V-8 motor, swift travel combines with easy steering, climbing and quick turning ability to give you tractor mobility. Swing speed is 5 RPM. Add to this the Live Boom Chain Crowd, and Split Second Clutches and you have the industry's fastest digging cycle.

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CROSS
HEXCREEN
Plates for Vibrating Screens

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This latest development in screening progress is our answer to the operator's need for larger capacity plus greater accuracy. It has all the advantages of both round and square perforations plus features never before enjoyed. Let us send full details.

We will also continue to supply perforated metal in all sizes of round, square, and slot perforations; for cylindrical, conical, vibrating and shaking screen equipment.

Write for literature.

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CARBONDALE, PA.
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5 Star Features

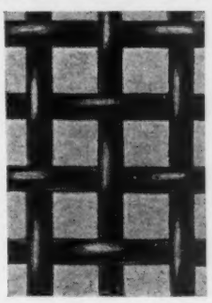
★ Lasts five times as long as cloth made of ordinary steel.

★ Withstands vibration without crystallization.

★ Super-tough to resist abrasion.

★ Maintains accuracy throughout life of screen.

★ Has outworn other special alloy cloths.



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Nat-Aloy cloth developed from a special alloy steel. It possesses the maximum of resiliency and springs back into shape after the screening load is removed, thus preventing permanent sagging and preserving the shape of the screen indefinitely.

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INDUSTRIAL BROWNHOIST
CLAMSHELL BUCKETS

CURTIS CRANE AND AIR HOIST

enable two men to pour a car wheel *a minute*



"Speed, Safety and Economy of Curtis Crane and Hoist Equipment cuts Production time and costs"

The Griffin Wheel Company, with main offices in Chicago, operates 12 plants in the United States. Curtis Cranes and Air Hoists are used to open and close molds, to propel mold conveyors, and for handling and pouring molten metal, operations that require the utmost accuracy, speed and safety. Mr. E. P. Waud, operating Vice-President of the Griffin Wheel Company, writes*:

"At our 12 plants we use a large number of Curtis Cranes and Hoists. For instance, we have found that one Curtis Crane and Hoist, at a total cost of $1.75 per day, including power (or the equivalent to 1/3 the wages of one man) is making it possible for two men to pour 200 tons of metal a day—a job that formerly required a gang.

"Because of its light but sturdy construction, Curtis equipment is easy to handle and speeds up production. Curtis construction has always proved dependable, its factor of safety high—a very essential point in handling molten metal."

Perhaps Curtis equipment can show you the way to new speed and economy in your industry as it has done in other industries. Why not consult our Engineering Department on your problems?

*Production executives will find Mr. E. P. Waud's report of vital interest. Copy will be sent on request.

CURTIS PNEUMATIC MACHINERY COMPANY
1988 Kienlen Avenue, St. Louis, Missouri
New York City — Chicago — San Francisco

CURTIS COMPRESSORS—AIR HOISTS—I-BEAM CRANES and TROLLEYS



It Costs Less for Fine Grinding with Williams Roller Mills

Instantly changeable from 70% 100 mesh to 99.9% 325 mesh.

Ball Bearing Operation.

Stronger Construction — Steel Castings at important points—Boiler Plate Separator Top.

Dries and Grinds Simultaneously.

If you have a job of fine grinding, limestone, lime, clay, coal, talc, gypsum or any other non-metallic mineral get the facts on the Williams Improved Roller Mill with Super-Separator. Repeat orders from some of America's biggest firms testify to its superiority. Built in six popular sizes. Write for descriptive matter.

Williams Patent Crusher & Pulverizer Co.
800 St. Louis Ave., St. Louis, Mo.

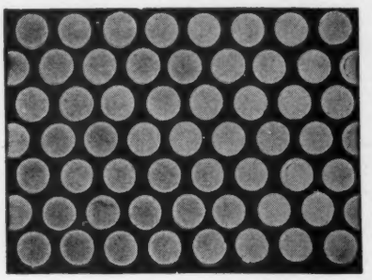
Chicago
37 W. Van Buren St.

New York
15 Park Row

San Francisco
326 Rialto Bldg.

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
Williams
PATENT CRUSHERS·GRINDERS SHREDDERS

MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

Prices are right.
Send for Bulletin 57.

The Morrow Manufacturing Co.
Wellston, Ohio

DeWITT OPERATED HOTELS

featuring—
Unusually Comfortable Rooms, Good Food, Carefully Prepared, and Rates from $2.50 Single

In Cleveland it's
The HOLLENDEN
RADIO IN EVERY ROOM

In Columbus it's
The NEIL HOUSE

In Akron it's
The MAYFLOWER

In Toledo it's
The NEW SECOR

In Miami Beach it's
The FLEETWOOD
An Exclusive Winter Resort Hotel

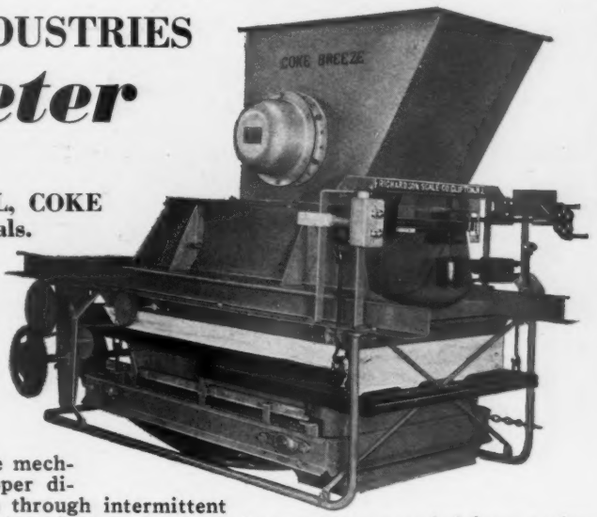
DeWitt Operated Hotels
are located in the heart
of their respective cities

FOR ALL ROCK PRODUCTS INDUSTRIES

THE *Conveyometer*

Measures, Checkweighs and Conveys

SAND, GRAVEL, CRUSHED STONE & LIME, COAL, COKE and similar granular, crushed and loose materials.



A single unit can be used to weigh sand to trucks or screens, quick-lime to hydrators, coal to driers, rock to storage or kilns, sand and stone to bins, bags or trucks.

A battery of CONVEYOMETERS can be used for proportioning the correct amounts of sand, coal and coke, phosphate rock, stone, limestone, feldspar, flint, clays, gypsum, etc., feeding these to pulverizers, kilns, furnaces, calciners, mixers, etc.

The CONVEYOMETER consists simply of a receiving hopper, feeder conveyor, weighing conveyor, necessary drive mechanism and register. Material passes through the feed hopper directly onto the feeding or measuring belt, which is driven through intermittent gearing. With each cycle a definite amount of material is deposited onto a second conveyor suspended from scale levers which proves the accuracy.

The accuracy is ALWAYS VISIBLE! It is the *only SELF-TESTING Feeder* and its accuracy is constantly flashed to the eye by electric signal lights.

Write for Bulletin 10134R, which fully describes and illustrates the CONVEYOMETER and its applications to your plant.

Richardson Scale Company

Clifton, New Jersey

Chicago Minneapolis Omaha Wichita Los Angeles Boston
Syracuse New York Atlanta Philadelphia Cleveland

"Of Great Service to Us"

PECK, STOW AND WILCOX



"We have used one of your cranes since November 1918," says The Peck, Stow and Wilcox Company. "This crane has been in constant service and is used for unloading coal, steel, pig iron and sand; also for the loading of cars of scrap and, in fact, for any miscellaneous jobs that we have around our yard. It has been, and is, of great service to us."

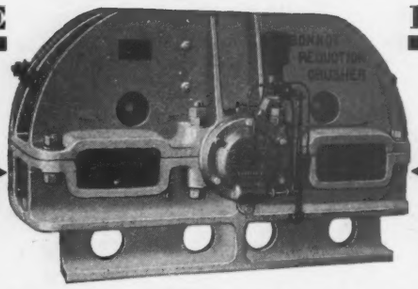
May we add that an Industrial Brownhoist locomotive or crawler crane will do as much in your plant yard and, at the same time, effect a remarkable saving.

INDUSTRIAL BROWNHOIST

GENERAL OFFICES: BAY CITY, MICHIGAN

New York, Philadelphia, Cleveland, Chicago

SINCE 1891



BONNOT
REDUCTION CRUSHERS
CIRCULATING LOADS

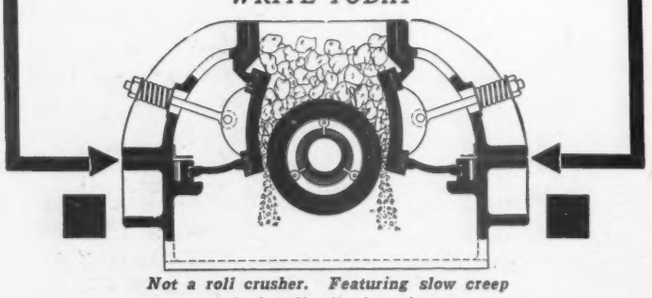
The Bugaboo of plant operators!

Have you considered the cost of circulating loads, chasing useless material through and through your crusher, over your screens and chutes, constantly wearing out your equipment. The average crusher is inefficient and will produce material to State and Federal specifications only at the expense of making considerable oversize.

Why not eliminate the costly circulating load and produce specification material with a BONNOT Reduction Crusher — Write for bulletin No. 150 showing illustrations of material as made in one pass, and compare this with the slabby material as produced by other crushers.

Let us send complete facts—let us show you what the operators say—see just how the BONNOT Reduction Crusher is built and why it must prove a profitable, sensible investment.

WRITE TODAY



Not a roll crusher. Featuring slow creep mantle for distribution of wear

Manufactured under U. S. Patent No. 1946763

THE BONNOT CO.
CANTON, OHIO
New York Office: 30 Church St.
Offices in Principal Cities



Falls Sand and Gravel Co., Scranton, Pa.

KNICKERBOCKER Soft Stone Eliminator

Meeting the State's Demand

What would you do with a bank of gravel that was swell for concrete except that it had 8% friable material—and the State put a limit of 2% on friables? If you were wise you'd do what Falls Sand and Gravel Co., Scranton, Pa., did. They installed a Knickerbocker Soft Stone Eliminator and reduced friable content to well under 2%—they're doing it efficiently and economically.

What objectionable material do **you** want to get rid of?

The Knickerbocker Company, 601 Liberty St., Jackson, Mich.

Coming to Allentown, Pa.?

HOTEL
TRAYLOR

*

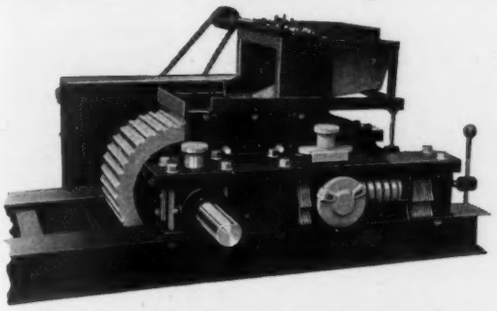
RADIO IN EVERY ROOM
MODERN AIR-CONDITIONED
DINING ROOM

*

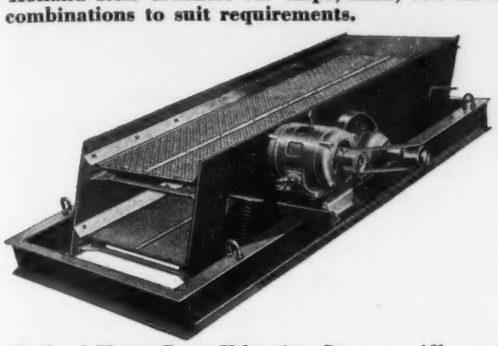
Room With Bath...$2.50

*

HAMILTON AT FIFTEENTH STREETS



New Holland Roll Crushers for chips, sand, etc. All sizes and combinations to suit requirements.

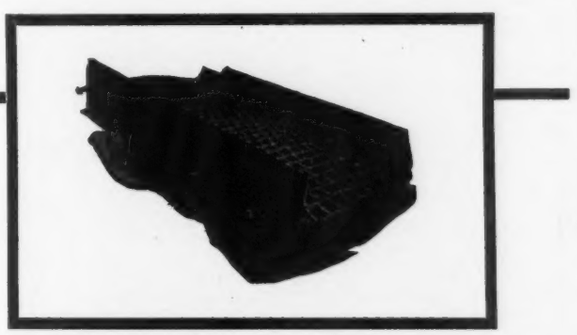


New Holland Heavy-Duty Vibrating Screens. All standard sizes in one, two and three decks.

Write for Bulletins

NEW HOLLAND MACHINE COMPANY

Box No. 100 New Holland, Pa., U. S. A.



There's More Production In Double Corrugated Plate

For high capacity . . . and the greatest measure of accuracy and efficiency . . . from your vibrating screens, use Hendrick Double Corrugated . . . the long-life vibrating screen plate.

HENDRICK MFG. CO.

47 Dundaff St. Carbondale, Pa.

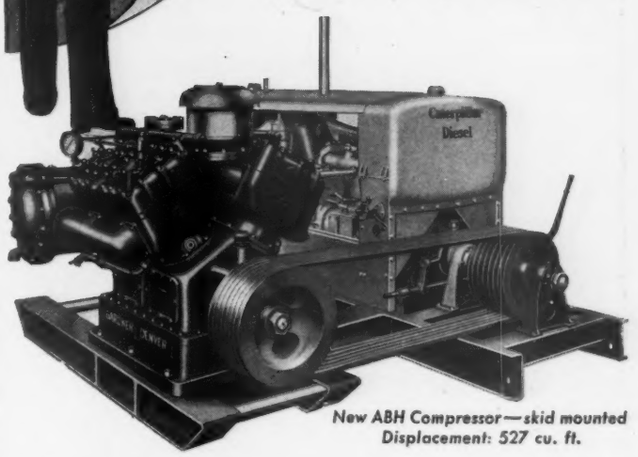
Baltimore Birmingham Boston
Cincinnati Cleveland Detroit Hazleton
New York Philadelphia Pittsburgh

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction



Change the Picture in YOUR Quarry

with this NEW Two-Stage, Water-Cooled Diesel-Driven Compressor



New ABH Compressor—skid mounted
Displacement: 527 cu. ft.

IF your power costs have been running too high... if you haven't had *enough* air for your jobs... here's the compressor that will change the picture. With the new Gardner-Denver ABH Diesel-driven compressor, you are sure of having an ample, dependable supply of air for drills, stone chisels, air hoists, lifts, direct-acting pumps and many other uses—PLUS lower power and maintenance costs and the tremendous fuel saving that the "Caterpillar" Diesel drive makes possible.

Backed by a world-wide reputation for quality, Gardner-Denver Two-Stage ABH Compressors give you advanced features of design obtainable nowhere else. Let us show you what these newcompressorscan do in YOUR quarry!

TWO-STAGE— to give you more air . . . cleaner, drier air . . . lower power cost.

WATER-COOLED— for lower discharge temperatures . . . less lubricating oil consumption . . . independence of atmospheric temperatures.

DIESEL-DRIVEN— to provide substantial savings in fuel costs.

GARDNER-DENVER COMPANY, 102 Williamson St., Quincy, Ill.

GARDNER-DENVER

MAKES AIR DO MORE AND COST LESS

DIXIE NON-CLOG HAMMER MILLS
Save Dollars Daily

They save dollars on the initial investment—save more dollars because of the tremendous wearing area of the breaker plate—then consider there is the rugged construction to save those profit-consuming repair bills. The DIXIE HAMMERMILL tackles the toughest reduction problems and solves them economically. It handles wet or sticky material without clogging and reduces material to any uniform given size in a single operation. It makes every job a more profitable one.

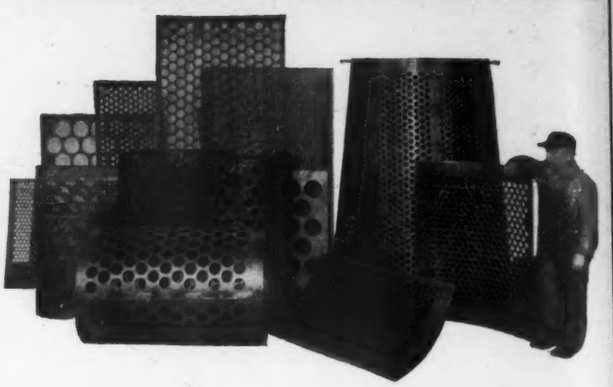


There are 40 sizes for any capacity—Primary—Secondary or Fine Reduction. Write for details.

DIXIE MACHINERY MFG. CO.

4209 Goodfellow Ave. **St. Louis, Mo.**

SCREENS of Perforated Metal



For Sand, Gravel, Stone and Ore. Perforations of all standard types, also of unusual sizes and layouts to give large production and reduced screening costs.

The Harrington & King PERFORATING Co.

5650 Fillmore St., Chicago, Ill. **114 Liberty St., New York, N. Y.**

Red Kerosene but the Lamp still Smoked



Then came red kerosene—novel, ritzy and what a sales argument. BUT—the light was no better and the lamp still smoked. Screens, like lamps, should be judged by the service they give—not the trimmings.

The Late Model UNIVERSAL Super-Vibrators enjoy a reputation for large capacity at low cost plus long economical service no matter how severe or exacting the operating conditions. The large percentage of re-orders bear this out. Our best arguments in favor of UNIVERSAL Vibrators are those offered by the operators using them.



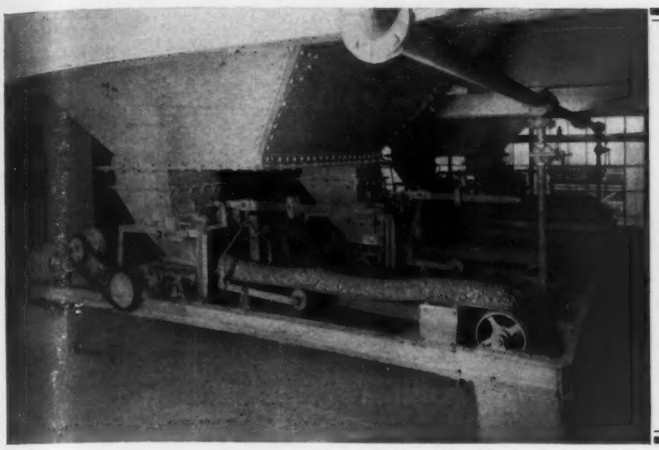
UNIVERSAL Vibrators cost less to begin with.

If Interested Write

UNIVERSAL VIBRATING SCREEN CO.

RACINE — — WISCONSIN

THE editorial library of Rock Products contains practically every obtainable treatise relating to the production of stone, sand, silica, phosphate rock, gypsum and other non-metallic minerals and on the manufacture of cement, lime, gypsum products, etc. The editors are technical men and are familiar with these books. Our library of manufacturers' literature is as complete and up-to-date as possible. Rock Products welcomes inquiries, and our facilities are ever at the disposal of our subscribers and advertisers.



99% ACCURATE

SCHAFFER POIDOMETERS are guaranteed to be not less than 99% accurate in the weighing and proportioning of material. They are automatic in action, self-contained and operate on a continuous basis. However, where batch operation is desired, our mechanical weigh-master attachment upon being set for a predetermined amount, causes the machine to stop when this amount has been delivered.

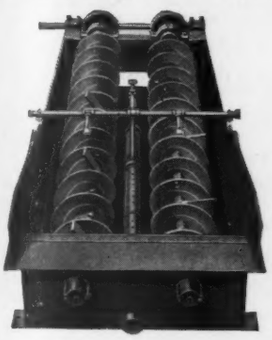
Our illustration shows a Battery of Poidometers Proportioning Raw and Finish Material at Birmingham, Alabama, Plant of Alpha Portland Cement Co.

Write for Catalogue No. Two.

SCHAFFER POIDOMETER CO.

2818 Smallman St. PITTSBURGH, PA.

EAGLE WASHERS



Single and Double

Spiral Screw and Log Type

Guaranteed removal of trash, sticks, leaves, coal, silt, mud-balls,—to the difficult clay-balls and iron oxide conglomerates.

EAGLE IRON WORKS

Des Moines, Iowa

WILFLEY Centrifugal SAND PUMP

PATENTED

for Slurry
for Sand Tailings



ELIMINATION of stuffing box has done away with many troubles common to centrifugal pumps.

Pump maintains extraordinary efficiency.

Pumping parts unusually heavy, insuring long life. Cleaning out pump or changing wearing parts requires only a few minutes.

Described and illustrated in Catalog No. 8

A. R. Wilfley & Sons, Inc., Denver, Colo., U. S. A.

New York Office: 1775 Broadway

AMERICAN *ROLLING RING* CRUSHER



Front View Showing Breaker Plate Adjustment

LOW FIRST COST makes the American Crusher a prime investment. Easy to install, dismantle and move.

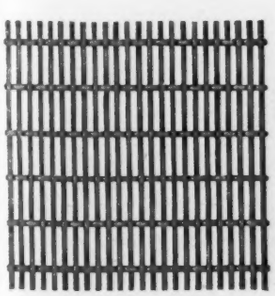
LOWER OPERATING COST because the American takes less power per ton of product. Flexible rotor assures protection from injury of tramp iron.

LOWER MAINTENANCE COST as the Rolling Rings wear many times longer than hammer surfaces.

Write today for facts on why the American Rolling Ring Crusher gives a more uniform product, with minimum fines and no slivers or chips.

AMERICAN PULVERIZER COMPANY

1245 Macklind Ave. St. Louis, Mo.

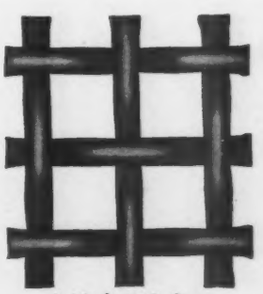


Rolled Slot

ALLOY No. 2

A proven Screen which will not only withstand vibration and resist abrasion, but will save you many replacement costs. Just what you are looking for.

To be had in Square Mesh and Rolled Slot. Once Tried—ALLOY No. 2—Always Used.



2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY

3574 E. 78TH ST. CLEVELAND, OHIO

Good Roads SCREENING EQUIPMENT



Revolving Screens for
Scalping — Sizing — Washing
24" to 60" Diameter
Vibrating Screens 1 to 3 Decks

Champion Roller-Bearing Rock Crushers
Complete Plant Installations

GOOD ROADS MACHINERY CORP.
KENNETT SQUARE PENNSYLVANIA

McLANAHAN PRODUCTS

Single, Double Roll Crushers—Super Dry Pans—Steel Log Washers and Scrubbers—Dryers—Jigs—Screens—Hoists, Elevators and Conveyors—Reciprocating Feeders, Bingates, Chutes, Turn Tables, Elevator Buckets, Car Pullers, Rail Straighteners, Cast Parts, Rough or Finished—Car Wheels and Brake Shoes, Sprockets and Sheaves, Gears and Bearings, Gratings and Columns, Chute Linings, Grate Bars of Special Heat-Resisting Metals.

Write for catalogues listed or for information concerning any of the material, machinery and castings listed, required in mine, quarry or pit.

McLANAHAN & STONE CORPORATION
Manufacturers—Founders—Machinists
Hollidaysburg (Established 1835) Pennsylvania

MANGANESE STEEL CASTINGS
for the
Rock Products Industry

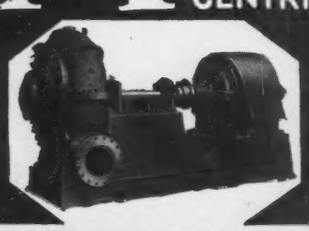
On Your Next Inquiry Specify
"INDIAN BRAND"
Known For Its Superior Shock
and Wear Resisting Qualities.

The Frog, Switch & Mfg. Co.
Established 1881 Carlisle, Pa.

LIMA
SHOVELS-CRANES-CLAMSHELLS-DRAGLINES
3-4yd.,1yd.,11-4yd.,11-2yd.,13-4yd. and 2-yd.
(A TYPE AND SIZE FOR EVERY JOB)

LIMA LOCOMOTIVE WORKS, Inc.
SHOVEL AND CRANE DIVISION
Lima, Ohio, U. S. A.

MORRIS CENTRIFUGAL PUMPS



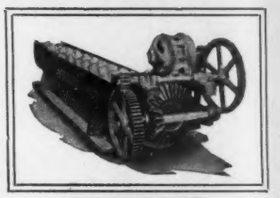
For handling sand, gravel, slurry, or clear water. Special designs and materials for each service. Also Hydraulic Dredges for sand and gravel production, deepening or enlarging lakes, reservoirs, waterways, etc.

Write for Bulletins

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

MORRIS MACHINE WORKS • BALDWINSVILLE, N.Y.

Why ship dirty stone when it can be made clean easily and ecomically?



SCRUBBER

This scrubber will do the good work.

State Capacity Required!

LEWISTOWN FOUNDRY & MACHINE CO.
Mfrs. of SandCrushing, Grinding, Washing and Drying Machinery
LEWISTOWN - - - - - PENNA.

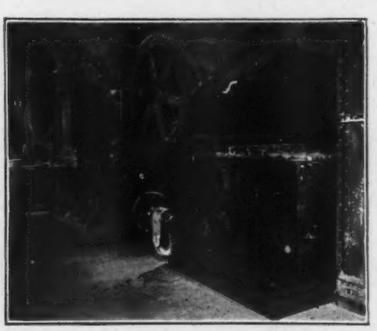
APPROVED —

by the U. S. BUREAU of MINES for Type A Dusts
Under Schedule 21

The new M-15 Dust Respirator, officially approved for safety—fit—comfort, is now available at a most attractive price. Order one for trial. Get details. Pulmosan Safety Equipment Corp., 176 Johnson St., Brooklyn, N. Y.

PULMOSAN M-15 DUST RESPIRATOR

"PENNSYLVANIA" *STEELBUILT*
SINGLE ROLL CRUSHER and HAMMERMILL



Put Your Reduction Problems Up to Us.

preparing "Easywork" Lime from R.O.K. Lump.

"Pennsylvania" *STEELBUILT* Primary and Secondary Crushers of the Single Roll, Hammermill and Jaw types are specialized for the preparation of Limestone for Stack and Rotary Kilns, for Cement Making, for Aggregate, and for Road Material.

Unbreakable Steel Construction
Positive Tramp Iron Protection

PENNSYLVANIA CRUSHER COMPANY
Liberty Trust Building
PHILADELPHIA, PA.
Branches in principal cities.

BACON

FARREL



Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

EARLE C. BACON, Inc.
17 JOHN STREET NEW YORK, N. Y.

HAYWARD BUCKETS

GOOD FOR YEARS OF HARD SERVICE
A HAYWARD Bucket is an investment, not a gamble. It helps you make a profit on every job.
THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

PRODUCE HIGH STRENGTH AND ALL TYPES OF MASONRY

CEMENTS

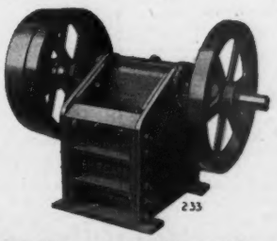
by the new process!

Inquiries invited from producers of cement, lime and allied products.

CEMENT PROCESS CORP.
P. O. Box 515 Mexico City, Mexico
All processes patented in U. S. and other countries.

Ehrsam Crushers

Roll Jaw Type



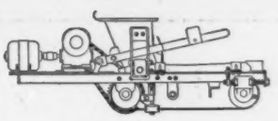
A full series from 8"x12" up. Plain bearings and roller bearings. Can be furnished mounted on trucks with or without elevator and power.

Elevating, Conveying and Power Transmission Machinery, Screens and Scrubbers, Complete Plaster Mills.

The J. B. Ehrsam & Sons Mfg. Co.
ENTERPRISE, KANSAS
Chicago Rep.: W. H. Kent, 431 South Dearborn Street

HARDINGE

FEEDERS



Constant Weight Feeders, Volumetric Belt Feeders, Non-Flooding Feeders, Proportioning Feeders, Disc Feeders. Write for Bulletin 33B.

HARDINGE COMPANY
INCORPORATED
YORK, PA.—Main Office & Works Chicago—205 W. Wacker Drive
New York—122 E. 42nd St. San Francisco—444 Market St.

LOWEST COST PER CUBIC YARD
Excavates and Conveys Long Distances

Made in wide range of sizes for large or small operations.

CRESCENT SCRAPER



For digging from wet or dry deposit, for stripping, for stock-piling and reclaiming.

Can be used to extend reach of Crane or Boom Dragline.

SAUERMAN BROS.
430 S. Clinton Street
CHICAGO, ILL.

Write for interesting 40-page catalog.

Perforated Metals—Screens of All Kinds—For Sand, Gravel, Stone, Etc.

MATERIAL IN STOCK
PROMPT SHIPMENT

CHICAGO PERFORATING CO.
2427 to 2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.

SYMONS

VIBRATING SCREENS
and
CONE CRUSHERS

Especially adapted for producing better crushed and graded materials in greater capacity at less cost.

NORDBERG MFG. CO.
MILWAUKEE, WIS.

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
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CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment for Sale

RESPONSIBILITY!

1—8'8x85' Ruggles-Coles Class A Rotary Dryer.
5—4x20, 5x26, 5x30, 6x35, same type.
3—3 and 5 roll Raymond High-Side Mills.
1—5 roll Raymond Low-Side Mill.
3—6'x35' Rotary Steam Tube Dryers.
1—No. 2 Sturtevant Ring Roll Mill with 10' separator, elevator, complete.
5—Air Classifiers, 30", 10', 12', 14'.
1—7"x24" Sturtevant Jaw Crusher, set to ½".
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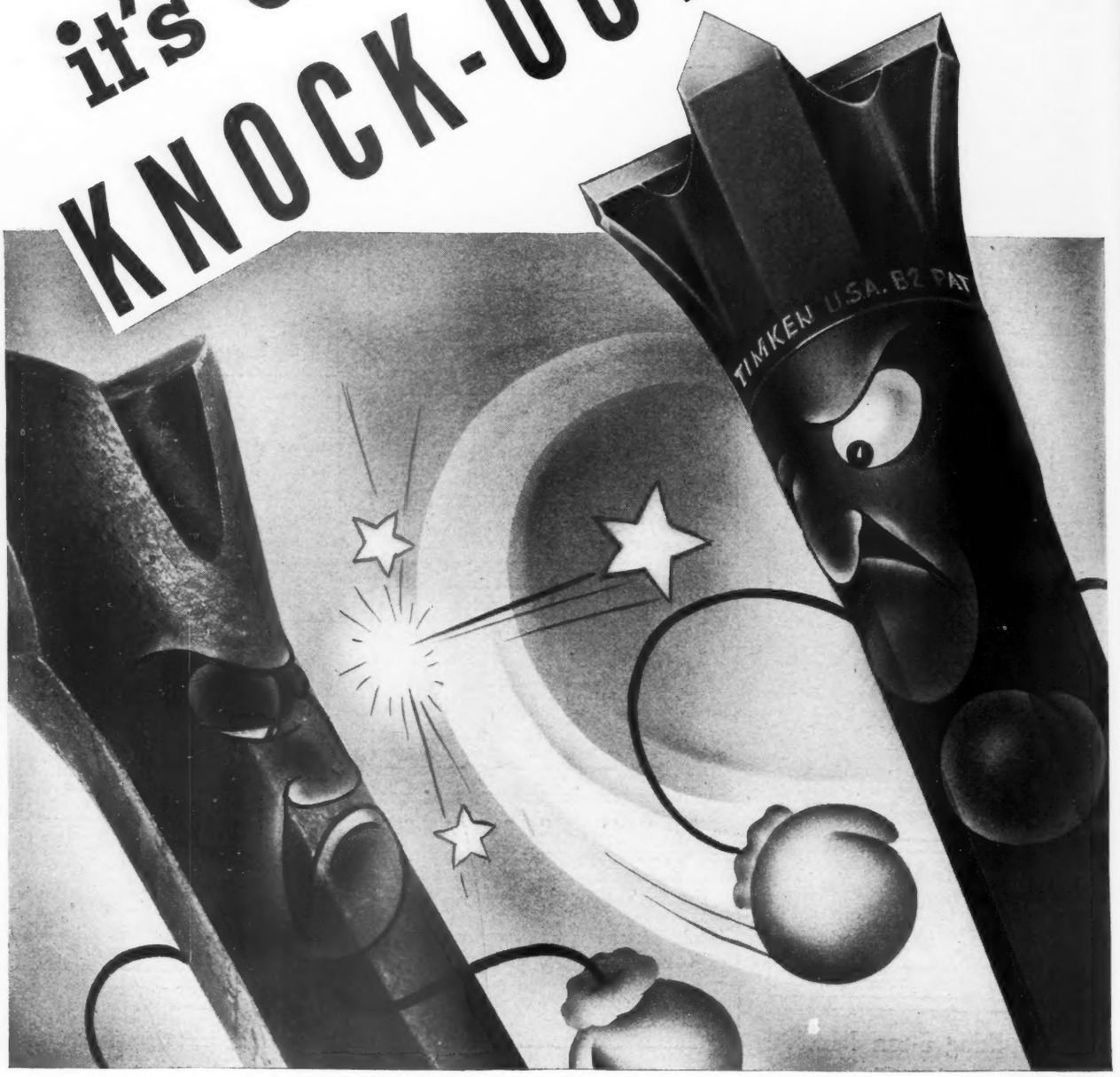
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